

THE BIOLOGICAL PHYSICIST

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ALLONS À MONTRÉAL!

This is an issue of THE BIOLOGICAL PHYSICIST you'll want to print out and take with you to Montréal. Packed with relevant information, this is the biggest blockbuster issue yet! We bring you a special welcome from the Program Chair, Denis Rousseau, an introduction to Montréal courtesy of one of Canada's best-known biological physicists, Leon Glass, and a complete listing of the DBP sessions at the March Meeting.

In keeping with our Montréal theme, this issue also features a profile of the Centre for Nonlinear Dynamics in Physiology and Medicine, based at McGill University.

But wait! There's more – PRE Highlights, a call for letters of intent from HFSP, and the DBP Election Roster. Remember to vote by March 18! And turn to page 11 for a special invitation, just for you!

To the Members of the Division of Biological Physics:

I want to welcome all of the members of the Division to the March Meeting in Montréal and express my thanks for all of your efforts to everyone who submitted Invited Session proposals and also to all of you who submitted contributed papers. We had over 25 proposals for Invited Sessions and they were all fantastic. Unfortunately, there is a limited number of Invited Sessions that we can sponsor so we were unable to include them all. However, to accommodate all of the exciting biological physics that was proposed, we created many Focus Sessions with one or two invited presentations supplemented by several contributed papers. As a result there will be a total of 109 invited lectures sponsored or co-sponsored by our Division at the March Meeting. We have also had a record year for contributed papers. We received 400 contributed papers that will be presented in either platform or poster sessions. Obviously with a total of over 500 presentations at the Meeting, there will be many overlapping sessions. However, owing to the richness and diversity of the program, I expect that you will always find interesting sessions to attend. When you examine the program you will see that it will include presentations by biologists who are becoming more quantitative and by physicists who are becoming more biological. As a result there is a wide range of topics with some sessions focusing on basic biological questions, some on medical issues, some on exciting new experimental and theoretical approaches to biological physics and others on very quantitative biology. Through all of your efforts and contributions, we will have a marvelous meeting this year. Two files are attached to help you make your decisions as to which sessions to attend. One file lists the epitome of the sessions we are sponsoring and the other lists all of the titles of the papers in our sessions. I hope you find these helpful and I apologize ahead of time for any errors or omissions. See you all in Montréal where we will have a great mix of science, friendship and food!

Denis Rousseau
March Meeting 2004 Program Chair

THE CENTRE FOR NONLINEAR DYNAMICS IN PHYSIOLOGY AND MEDICINE BY LEON GLASS AND MICHAEL C. MACKEY

The Centre for Nonlinear Dynamics in Physiology and Medicine was created in 1989 with the main objective of fostering research directed at the understanding of the origin of dynamic behavior in health and disease. The Centre (see <http://www.cnd.mcgill.ca>), directed by Michael Mackey, is now composed of a diverse group of researchers at several different institutions, with its administrative center at McGill University in Montréal. In addition to providing local environments that nurture the interdisciplinary training of undergraduate and graduate students in nonlinear dynamics, the members of CND have played an active role in fostering research between the biological and more quantitative sciences and in disseminating applicable concepts from nonlinear dynamics by organizing conferences, workshops, summer schools, and by editing and authoring books.

The CND currently consists of faculty, postdoctoral fellows, and graduate students from McGill University, Université de Montpellier 1, Université de Montréal, Concordia University, University of Ottawa, University of Waterloo, University of Victoria, University of Chicago, Weizmann Institute and Instituto Politécnico Nacional (Mexico City). The research is organized around several different themes.

Research

Cell and Molecular Biology

A number of CND researchers have active interests in the field of cellular and molecular biology.

In the field of gene regulation, Peter Swain (McGill), working with Michael Elowitz (California Institute of Technology), has investigated whether the small numbers of regulatory molecules and genes in cells lead to significant and experimentally measurable stochasticity in gene expression. Their work demonstrates the intrinsic noisiness of the cellular milieu and has potentially important consequences for the reliability and efficiency of biological signal transduction. Michael Mackey (McGill) and Moises Santillan (Instituto Politécnico Nacional) actively

study bacterial gene regulation dynamics in the *lac* and *trp* operon, the phage λ lysis-lysogeny switch, as well as eukaryotic gene regulation through the Hes1 protein oscillations following serum shock. The long term goal of these studies is to build up a catalogue of ever more complex gene network models to eventually help understand the integrated regulation of molecular systems. Leon Glass (McGill), with Jonathan Mason, Paul Linsay, and James Collins at Boston University, is developing methods to evolve mathematical and electronic models of large scale general genetic networks to obtain complex dynamic behavior. In collaboration with colleagues Theodore Perkins and Michael Hallett at the McGill Centre for Bioinformatics, he is developing methods to determine the structure of models of complex genetic networks based on observed dynamics. This work is

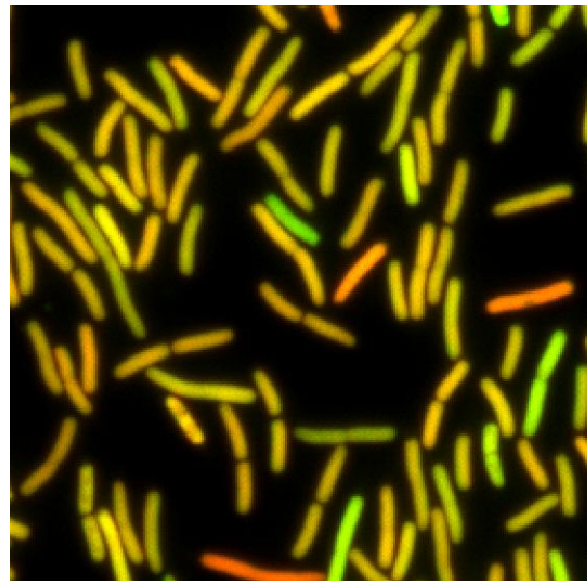


Fig. 1. Bacteria simultaneously expressing two different fluorescent proteins (red and green) from identical promoters. Purely deterministic gene expression would result in equal amounts of both types of protein in each bacterium and so to a population which appears mostly yellow. Here, the significant color variation shows that gene expression in vivo is not deterministic but significantly stochastic, or noisy. For more details see Elowitz et. al. *Stochastic gene expression in a single cell*, *Science* 297, 1183 (2002). (Picture courtesy of Michael Elowitz).

being applied to analyze the structure of real networks controlling development in the fruit fly. It is complemented by the studies of Rod Edwards (Victoria), which revolve around a number of mathematical questions, such as synchronization between parallel copies of networks and the dynamics of classes of high-dimensional switching networks.

Alejandro Rey (McGill) theoretically studies the formation of the defect free twisted plywood architectures found in all natural materials, including bone, shells, nuts and grains, and solutions of DNA. His work in this area is seminal and is leading to further understanding of the complicated structure of a variety of biomaterials and how these contribute to observed *in vivo* and *in vitro* architectures.

At a cellular/tissue level, Jacques Bélair (Université de Montréal) and Michael Mackey (McGill) use the characteristics of periodic hematological diseases (e.g. periodic leukemia, cyclical neutropenia) in conjunction with experimental and clinical data to understand regulation of cellular replication and the role of apoptosis in that process. The goal is to suggest better treatment strategies for these diseases (and has been partially achieved for cyclical neutropenia). Jacques Bélair also investigates detailed models of drug administration.

Roy Caplan (Weizmann Institute & McGill) studies the bacterial flagellar rotary motor in collaboration with Dieter Walz of the Biozentrum, University of Basel. Molecular motors are generally considered to work on a ratchet principle and so it is usually assumed that the flagellar motor operates via a stepping mechanism. This view is supposedly supported by a fluctuation analysis. However, a ratchet-free electrostatic model, introduced by CND researchers, which does not step, closely reproduces a wide variety of kinetic data, and exhibits identical stochastic behavior. Hence, a non-stepping mechanism may well reflect the *in vivo* reality.

Neurobiology

André Longtin's (Ottawa) interests lie in theoretical and computational neurobiology, where he is developing mathematical models of neural activity at several different levels in the nervous system. These levels range from that of the single cell (where the biophysics of sensory transduction and information processing is studied) to systems of cells (where the focus is on the role of feedback within and between populations of cells).

At a higher level, John Milton (Chicago) studies the neural mechanisms involved in the acquisition and perfection of motor skills. Experimentally, this work ranges from studies of the effect of motor unit synchronization on chewing in the invertebrate *Aplysia* to complex human (golf swing) motor skills. Noise and time delays are intrinsic properties of the nervous system and so mathematical modeling necessarily involves stochastic differential delay equations. The long term goal of his research is to develop targeted neuro-rehabilitation strategies so as to shorten the time required for skill acquisition. Transition from the bench to the bedside is facilitated through the Neurology Golf Clinic, which is a unique clinic (set up by Milton) that helps people overcome their neurological and physical challenges through the game of golf.

In a similar vein, Anne Beuter (Montpellier) and Rod Edwards (Victoria) pursue research related to movement disorders. They develop indices to capture the specificity of each disorder (such as tremor, hypertonus, rapid alternating movements, pointing tasks, etc.), which allow them to test various hypotheses regarding the control mechanisms involved. Specifically, they hope to improve understanding of the origin of tremor in Parkinson's disease, the control of upright stance and the modifications in this process associated with Down's syndrome. In addition, Beuter has studied the effects of chronic exposure to methyl mercury on motor control.

Sue Ann Campbell's (Waterloo) research centers on the regulatory feedback systems which occur in a physiological (or mechanical) context. A particular emphasis is the effect of time delays in these models. Recent work includes a mathematical/numerical study of pattern formation in rings of neurons with application to the understanding of reentrant cardiac rhythms, and a joint mathematical and experimental study of delayed feedback in an inverted pendulum, which relates to postural control and the generation of sway in humans.

Cardiology

Leon Glass (McGill) is studying mechanisms of cardiac arrhythmias (disturbances in heartbeat rhythm). In collaboration with Alvin Shrier at McGill, voltage- and calcium-sensitive dyes are being used to map the spread of waves of activity in tissue cultures of heart cells. Former postdoctoral fellow, Gil Bub observed dynamics in the tissue culture depend on the age and density of the cells as well as the addition of pharmacological agents. Optical

recordings demonstrating spontaneous spatio-temporal bursting patterns, that help elucidate mechanisms of cardiac arrhythmias, can be found at Dr. Bub's "hot" web site <http://www.cnd.mcgill.ca/bios/bub>. This research has also been featured at the Inside Science News website <http://www.aip.org/isns/reports/2002/036.html>.

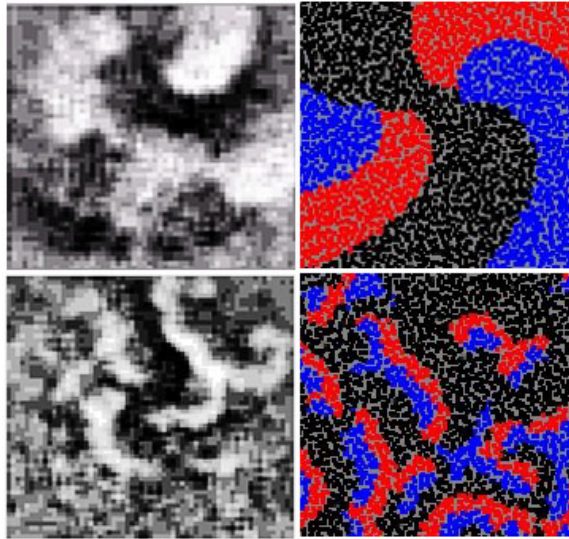


Fig. 2. *The effect of lowering connectivity on dynamics in an embryonic chick cardiac cell culture and in a cellular automaton model. Top left: Two interacting spiral tips in a well coupled (control) monolayer. Bottom left: Multiple spiral waves after lowering connectivity by pharmacologically blocking gap junctions. Top right: Two interacting spiral tips in a cellular automaton model with high local connectivity. Bottom right: multiple interacting spirals in the same cellular automaton model with reduced connectivity. For more details see: Bub G., Shrier A., Glass L. Spiral wave generation in heterogeneous excitable media. *Phys. Rev. Lett.* 88, 058101 (2002). (Figure provided by G. Bub).*

As part of the Research Resource for Complex Physiologic Signals (<http://www.physionet.org>), centered in Harvard Medical School, Glass, with Ary Goldberger, is analyzing recordings of heart activity to develop new methods that can be used to predict risk for sudden cardiac death. As part of the Mathematics of Information Technology and Complex Systems (MITACS) National Center of Excellence (<http://www.mitacs.math.ca>), he has collaborated with former postdoctoral fellow Katsumi Tateno to develop new methods to automatically identify abnormal heart rhythms.

Michael Guevara (McGill) is interested in how the lack of blood flow to the heart (ischemia) can give rise to cardiac arrhythmias. Many of these arrhythmias (e.g. ventricular tachycardia and fibrillation) are thought to be due to spiral-wave reentry, and are preceded by a phase in which there is a beat-to-beat alternation in the electrical activity of the heart. Since it is inherently very difficult to experimentally obtain a reproducible or stationary degree of ischemia, Guevara uses numerical simulation to investigate the connection between the alternans and the subsequent arrhythmias. Alternans can be seen in the modeling work and can be triggered by a premature beat or a pause in stimulation. For some movies of simulated arrhythmias, see <http://www.medicine.mcgill.ca/physio/guevaralab>.

Alain Vinet (Montréal) is focused on understanding the mechanisms responsible for the onset and spatio-temporal evolution of atrial and ventricular cardiac arrhythmias resulting from reentry. He also studies the modulation of the electrical properties of the cardiac tissues by the autonomic nervous system. One aspect of this work deals with the mathematical modeling and numerical simulation of the electrical properties of cardiac tissue. A second is concerned with the processing and analysis of cardiac electrograms recorded in patients and animal preparation. These include multichannel recordings obtained in animal preparations and in patients during open-heart surgery, fluorescence measurement of cardiac propagation through voltage-sensitive dye in in-vitro cardiac tissue, as well as long term ambulatory electrocardiographic monitoring.

Applied Mathematics

Although all members of the CND apply mathematics to study biological dynamics, some of the work is directed especially at developing novel mathematical concepts that may be applicable for a broad range of problems.

Eusebius Doedel (Concordia) is the original and principal author of the renowned numerical bifurcation software AUTO, which is used worldwide in many different research areas, and parts of which have been incorporated in other highly used mathematical software, including CONTENT, XPPAUT, PCR, POLYRED. Recent development of AUTO2000 was carried out with postdoctoral fellow Randy Paffenroth at the California Institute of Technology. Doedel has recently discovered relatively simple, yet previously unknown periodic solutions for the restricted three body problem. These orbits, their bifurcations, and stable/unstable

manifolds are of interest to researchers in space-mission design.

One of the unifying mathematical themes of the CND is that time delays play a significant role in biological systems, and that it is therefore essential to understand better the dynamics of equations that incorporate such delays. An early delay differential equation proposed by Mackey and Glass is now a prototypical example of a chaotic system. More recent analytical work, especially by Campbell and Bélair, provides fundamental new results about the bifurcations present in differential equations with multiple delays.

Another unifying mathematical theme is identifying the roles of deterministic chaos and noise in shaping complex rhythms and fluctuations in biological systems. These questions have arisen recently in the modeling of genetic networks by Swain, in the analysis of information processing in neural systems by Longtin, Milton, Beuter, and Edwards, and in the origins of irreversibility by Mackey.

Outreach

In addition to research activities, members of the CND have assumed a key role in helping to develop the field of nonlinear dynamics as applied to problems in physiology and medicine. Members from the CND sit on many editorial boards, and have held offices in the Division of Biological Physics of the American Physical Society, the Society for Mathematical Biology and the Canadian Society for Theoretical Biology. We are participating in the activities of the Research Resource for Complex Physiologic Signals and of MITACS. We have helped organize many conferences and authored or edited many books, the most recent of which is *Nonlinear Dynamics in Physiology and Medicine* (Springer-Verlag, 2003), edited by A. Beuter, L. Glass, M.C. Mackey and M.S. Titcombe. We have successfully run summer schools on nonlinear dynamics applied to the biological sciences in 1996, 1997, and 2000. The next will be in May, 2004 (see <http://www.cnd.mcgill.ca/summerschool>) on the theme Systems Biology Dynamics: from Genes to Organisms.

Publications

Members of the CND have published actively. Complete lists of papers can be found at <http://www.cnd.mcgill.ca>. The following list is representative of some of the work discussed above.

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“BRING IT ON!”

THE 2004 DBP ELECTION SLATE

The race for the U.S. Democratic nomination may be all wrapped up, but the DBP elections are just beginning! Below is a list of candidates, along with their biographical sketches and campaign statements. As an official representative of the DBP Political Machine, your Editor urges you to vote early and often, and watch out for those chads!

For Vice-Chair Elect (vote for 1 out of 2)

(1) Marilyn R. Gunner

Marilyn Gunner is Professor of Physics at The City College of New York. She received her Ph.D. in Biophysics from the University of Pennsylvania (1988). Professor Gunner is a theorist who works on the thermodynamics and dynamics of electron transfer in proteins and on general problems of protein molecular dynamics. She is a member of Biophysical Society (Bioenergetics Subgroup), International Society of Photosynthesis Research, Protein Society, American Chemical Society (Physical Chemistry Subgroup) and the American Physical Society (Biological Physics Division). She was Chair of the Photosynthesis Gordon Conference 2003, is a Panel Member of the NSF Molecular Cellular Biophysics study section (2002-2005) and serves on the Editorial Board of the Biophysical Journal (2003-2006). She was a recipient of the N.I.H. Individual National Research Service Award (1997-2002) and the Presidential Early Career Award for Scientists and Engineers (1997-2002).

Statement

Biophysics represents one interdisciplinary wing of physics, bringing together aspects of physics, biology, chemistry, information theory, medicine, and engineering. The first challenge for the Division of Biological Physics is to continue to provide opportunities for members of the division to share and learn about cutting edge science. The second task is to educate physicists in other APS divisions about the exciting science coming out of the DBP, highlighting opportunities for students in biophysics.

Lastly the division can build on our interdisciplinary nature by strengthening our connections with biophysicists who find their home in other societies. To that end I would like to explore shared memberships in The Biophysical Society and the European Physical Society, and explore shared meetings of the Biophysical Society and Division of Biological Physics.

(2) Miriam Rafailovich

Miriam Rafailovich is Professor of Materials Science and Engineering at SUNY Stony Brook. She graduated from Brooklynn College with majors in physics and biology. She received her Ph.D. in Physics from SUNY Stony Brook in 1981. She spent four years at the Weizmann Institute, 4 years at Queens College and since 1982 has been at Stony Brook University. She is currently director of an NSF-MRSEC on Polymer at Engineered Interfaces and head of a new program in Chemical and Molecular Engineering. Her research interests continue to evolve and the polymer program has expanded to include collaborations with the Stony Brook School of Medicine on biopolymer engineering, surface DNA electrophoresis, and cell/surface mechanical measurements.

Statement

I was raised in physics at the edge. My PhD thesis involved the measurements of local moments of magnetic impurities, but using nuclear recoil implantation rather than standard nuclear methods. Later this evolved into nuclear scattering from soft matter, which got even softer and turned into biological tissue. Somehow, the edge always offered more excitement. It was the place where you met scientists from other disciplines and where you could really appreciate the beauty of physics and test to the limits the fundamental aspects of its laws. Today, I feel that the exciting edge is definitely at the boundary with the life sciences. Biophysics and bioengineering are the fastest growing disciplines in academic programs across the country and abroad. As the division within the APS that represents this

edge, I think that we are in an excellent position to capitalize on this excitement and entertain significant growth within the coming few years. With rapid growth come large challenges. How does one define the leading edge of a field when it is highly interdisciplinary? How does one keep up with the exponentially increasing complexity of the discipline without losing its focus? How can we reach outside of the academic community and maintain our relevance? Finally, how can we attract younger scientists into the division without overwhelming them? To this end I propose: (a) A stronger recruiting effort towards members in the traditional health professions, (b) Fostering joint symposia and workshops with other divisions of the APS, (c) Strengthening our educational programs (tutorials and workshops prior to national conferences which address fundamental issues in both physics and biology, (c) continue the highly successful workshops for graduate students and post doctoral associates, (d) partner with the National Science Foundation which sponsors the Research Experience for Undergraduates (REU) and Research Experience for Teachers (RET) programs in organizing special symposia aimed at this group and e) strengthening our international connections and partnering with the European Physical Society, possible through joint meetings and workshops.

**For Member at large
(vote for 2 out of 4)**

(1) Deborah K. Fygenon

Deborah Fygenon is Assistant Professor of Physics and Biomolecular Science & Engineering at the University of California, Santa Barbara. She received her BSc in Physics from MIT in 1989 and her PhD in Physics from Princeton University in 1995. She then spent a post-doctoral year at the Center for Studies in Physics and Biology at Rockefeller University and two more years as a Jane Coffin Childs Post-Doctoral Fellow in the Hedco Molecular Biology Laboratories at the University of Southern California before joining the physics faculty at UCSB in 1998. Deborah received a CAREER award from the National Science Foundation in 2000 and an Alfred P. Sloan Fellowship in 2001. She is an active member of both the APS and the Biophysical Society. In winter of 2003 she co-organized a Biological Physics Program at the Kavli Institute for Theoretical Physics and more recently she served on the steering committee for the DBP workshop on Opportunities for Physicists in Biology.

Statement

The number of physicists applying their skills to understanding biological phenomena is growing at an enormous pace. The DBP has an important role to play in facilitating the biological training of the interested physicist, highlighting opportunities for research and technology development, and stimulating dialogue within and across disciplines. As member-at-large, I would look forward to working with the other elected division representatives in identifying and organizing means by which the DBP can most effectively play this role.

(2) Steven Quake

Stephen Quake is a Professor of Applied Physics and Physics at the California Institute of Technology. He studied physics (BS 1991) and mathematics (MS 1991) at Stanford University before earning his doctorate in physics from Oxford University (1994) as a Marshall scholar. Prior to joining Caltech in 1996, he spent two years as a post-doc in Nobel Laureate Steven Chu's group at Stanford University. His interests include precision methods in single molecule biophysics and biochemistry and the development of integrated microfluidic technology. Recently his lab has been exploring applications of lab on a chip technology in functional genomics, genetic analysis, and protein design. In 2003 his group demonstrated the first successful single molecule DNA sequencing experiments. He received Career and First awards from the National Science Foundation and National Institutes of Health in 1997 and was named a Packard Fellow in 1999. Quakes contributions to the development of new biotechnology at the interface between physics and biology have been recognized by recent awards from the MIT Technology Review Magazine, Forbes, and Popular Science. He is a founder and board member of Fluidigm, Inc. and Helicos, Inc.

Statement

It is sometimes said that physics is the study of the very large, the very small, and the very complex. Biology is nothing if not complex, and there are many wonderful intellectual opportunities for physicists at this exciting frontier. Over the past several years my research has been at the nexus of physics, biology and technology and I have been able to participate in a spectrum of research ranging from pure science to applied physics to industrial commercialization. If elected to the DPB Executive Committee I would do my best to help organize the

future direction of the DBP in as broad and inclusive a manner as possible and to amplify the influence and voice of the physics community in the biological sciences.

(3) Lois Pollack

Lois Pollack is Assistant Professor of Applied Physics at Cornell University. Her thesis work was on spin-polarized atomic hydrogen at MIT (1989). She came to Cornell work with Bob Richardson in the Microkelvin Laboratory, where she studied low temperature order in metallic systems. In 1997, she applied for and received an NSF Career Advancement Award, funding a career direction change. She was able to change the focus of her research program to Biological Physics. In 2000 she joined the faculty in the School of Applied and Engineering Physics at Cornell as an Assistant Professor. Her present research interests focus on macromolecular (protein/RNA) dynamics and folding, and the role of electrostatics in biology.

Statement

Biological physics is a new frontier; it's an exciting time to be involved in both research and education in this rapidly changing field. Recent advances have resulted from the application to biological problems of tools developed by and for physical scientists. Coupled with advances in biological science, most notably the level of control over sample preparation achievable in many laboratories, the conditions are ripe for continued, successful interaction between the disciplines.

Success in any interdisciplinary venture begins with communication between individuals who may not, at first, share a common scientific language. The American Physical Society should continue to provide forums for discussion of interdisciplinary topics, bringing together experts from different disciplines for panel discussions. Attention should also be paid to broadly educating the next generation of physicists. Many physics departments have begun to offer courses in biological physics. I know, from speaking with many colleagues who, like myself, have been asked to develop/teach these courses, that a forum for exchange of ideas about curriculum, textbooks and teaching laboratories, would be extremely valuable.

The recent growth of the Division of Biological Physics within the American Physical Society is a clear signal that there is a strong interest in these fascinating problems within the physics community.

(4) Chao Tang

Chao Tang came to US from China through the CUSPEA program and obtained his PhD in statistical physics at the University of Chicago. He then worked as a postdoctoral fellow at the Brookhaven National Lab and the Institute for Theoretical Physics at UC Santa Barbara, before joining the NEC Research Institute (now NEC Labs America) at Princeton in 1991, where he is now a Senior Research Staff Member. Tang's current research interest is primarily in biological physics, which includes protein folding and design, gene regulation, and biological networks. He has previously worked on various problems in statistical and nonlinear physics, including self-organized criticality, scaling, interfacial growth, nonlinear dynamic systems, and vortices in superconductors. He has co-organized many conferences and workshops on biological physics, including the ITP program on Statistical Physics and Biological Information and the Princeton Lectures on Biophysics. He also has a joint appointment with Peking University in Beijing where he is the director of the Center for Theoretical Biology. Tang is an APS fellow.

Statement

Biology is becoming more and more quantitative and interdisciplinary. It is a unique fertile ground for the application and the enrichment of physics. There are a fast increasing number of physicists who are interested in all of kinds of biological problems. On the other hand, while I believe that we should not seek the immediate approval from the biologists for every work we do, it is vital to have a constant dialog between the two communities. If elected, I would like to see DBP continue to play active roles in promoting communication and exchange within our community, in building bridges with the biology community, and in helping fresh physicists, especially young people, to make the "transition".

For Secretary/Treasurer

Shirley Chan

Shirley S. Chan, originally from Hong Kong, received her B. Sc. in physics from Western Illinois University, her M. Sc. in physics and Ph. D. in biophysics from University of Illinois, Urbana-Champaign. Her thesis research was on the dynamics of ligand binding to heme proteins using flash photolysis, under Hans Frauenfelder as her advisor.

She did her post-doctorate research at the Max Planck Institute for Biophysical Chemistry, Göttingen, with Thomas and Donna Jovin studying cell surface-protein interaction by fluorescence energy transfer microscopy and cell sorter. After Germany, she spent several years in three industrial laboratories: studying petroleum catalysts by in-situ Raman spectroscopy at Exxon, developing monitoring probes for patient's blood oxygen at the BOC Group, and as a fluorescence product manager at Photon Technology. Then she joined Kenneth Breslauer at Rutgers University, collaborating with Robert Austin of Princeton University in the investigations of DNA structures, notably the characterizations of the premelting change of certain DNA sequences by various optical and thermal methods. In 1994-6, she was elected to serve as an Executive Member-at-Large of DBP. She has co-authored in about 80 research articles. With young children to raise, she has been doing some consulting work in the area of nanotechnology applications to

DNA. Currently she is working on the manuscript based on the lecture notes from Hans Frauenfelder for biophysics to be published as a text book.

Statement

I have been a member of Division of Biological Physics since the division was formed in mid-1970's when I was a graduate student. I served one term as an Executive Member-at-large in mid-90's. I understand the importance of the responsibility of the secretary-treasurer who is to serve as the continuity link of the division from one elected chair to another so that the division's business can be conducted properly and timely. Also I would like to ensure the DBP's travel grants for needy graduate student-authors for the March Meeting to be awarded every year. Residing in Princeton, NJ, I have a small geographic advantage to work with APS. If elected, I will attempt my best to do so..

SPECIAL INVITATION!

**The Division of Biological Physics invites all members and their friends to a reception at Buffet Maharaja
(1481 Bd. René-Lévesque Ouest, 514-934-0655)
on
Wednesday, March 24 at 7:30 PM.**

There will be an all you can eat buffet for a cost of about \$13.50 Canadian plus service. Drinks will be available for an extra charge. This is in the downtown Montreal area near the Guy Metro and close to the nightlife area on Crescent Street. This will be a great chance for Division of Biological Physics members to meet each other, so we hope you will be able to come.

INTERDISCIPLINARY RESEARCH SURVEY

As part of the National Academies Keck Futures Initiative, the National Academies-under the aegis of the Committee on Science, Engineering, and Public Policy- has undertaken a study on how funding organizations and academic institutions can best facilitate interdisciplinary research.

The strength of the Committee's findings and recommendations depends on the most up-to-date assessment of the state of interdisciplinary research.

To that end, the Committee encourages individual interdisciplinary researchers and students to take 10 minutes to complete a survey, available on-line at

<http://www7.nationalacademies.org/interdisciplinary/SurveyHome.html>.

Your responses will help the Committee identify the most serious obstacles facing interdisciplinary researchers, to determine examples of effective policies and practices, and establish recommendations for best practices to facilitate interdisciplinary research.

PRE HIGHLIGHTS

Biological Physics Articles From Physical Review E

(Statistical, Nonlinear, and Soft Matter
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Modeling charge transfer in the photosynthetic reaction center

[Michal Pudlak](#) and [Richard Pinčák](#)

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061901

Analytical solution of a neutral model of biodiversity

[M. Vallade](#) and [B. Houchmandzadeh](#)

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061902

Adsorption of monovalent and multivalent cations and anions on DNA molecules

[E. Allahyarov](#), [H. Löwen](#), and [G. Gompper](#)

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Hierarchical population model with a carrying capacity distribution for bacterial biofilms

[J. O. Indekeu](#) and [K. Sznajd-Weron](#)

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Budding of crystalline domains in fluid membranes

[T. Kohyama](#), [D. M. Kroll](#), and [G. Gompper](#)

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Motion of a rotatory molecular motor and the chemical reaction rate

[Hiroschi Miki](#), [Masatoshi Sato](#), and [Mahito Kohmoto](#)

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Distinct regimes of elastic response and deformation modes of cross- linked cytoskeletal and semiflexible polymer networks

[D. A. Head](#), [A. J. Levine](#), and [F. C. Mackintosh](#)

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061907

Modeling the concentration- dependent permeation modes of the KcsA potassium ion channel

[Peter Hugo Nelson](#)

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061908

Thermal denaturation of a helicoidal DNA model

[Maria Barbi](#), [Stefano Lepri](#), [Michel Peyrard](#),
and [Nikos Theodorakopoulos](#)

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[L. Frappat](#), [C. Minichini](#), [A. Sciarrino](#), and
[P. Sorba](#)

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Reparametrizing the loop entropy weights: Effect on DNA melting curves

[Ralf Blossey](#) and [Enrico Carlon](#)

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061911

Clustering in neutral ecology

[B. Houchmandzadeh](#) and [M. Vallade](#)

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061912

Nonlinear analysis of correlations in Alu repeat sequences in DNA

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[Ruizhen Xu](#), and [Saifeng Xiao](#)
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Robustness of retrieval properties against imbalance between long-term potentiation and depression of spike-timing-dependent plasticity
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Lipid membranes with free edges
[Z. C. Tu](#) and [Z. C. Ou-Yang](#)
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Two-electron transfer reactions in proteins: Bridge-mediated and proton-assisted processes
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Phase switching in a system of two noisy Hodgkin-Huxley neurons coupled by a diffusive interaction
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BRIEF REPORTS

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[D. Bollé](#), [D. R. C. Dominguez](#), [R. Erichsen, Jr.](#), [E. Korutcheva](#), and [W. K. Theumann](#)
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Error and repair catastrophes: A two-dimensional phase diagram in the quasispecies model
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Sequence variability of proteins evolutionarily constrained by solution-thermodynamic function
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Analysis of the intraspinal calcium dynamics and its implications for the plasticity of spiking neurons

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Regulation of spontaneous rhythmic activity and organization of pacemakers as memory traces by spike-timing-dependent synaptic plasticity in a hippocampal model

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Stretching of proteins in the entropic limit

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Pressure-induced ordering in mixed-lipid bilayers

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Orientation tuning and synchronization in the hypercolumn model

[Sang-Gui Lee](#), [Shigeru Tanaka](#), and [Seunghwan Kim](#)

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BRIEF REPORTS

Motor protein with nonequilibrium potential: Its thermodynamics and efficiency

[Hong Qian](#)

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Kinetics of ligand equilibration between tubular and vesicular parts of the endosome

[Leonardo Dagdug](#), [Alexander M.](#)

[Berezhkovskii](#), and [George H. Weiss](#)

Published 29 January 2004 (*4 pages*)
012902

Introduction to Montréal

By Leon Glass

Montréal is a great city to visit. I hope that during the APS meeting you will find some time to explore the unique and beautiful setting of Montréal and get a chance to get to know some of its people and places. Here is a brief introduction to help you orient and have a good time during the APS March Meeting for the times that you will venture away from the Convention Center.

Montréal is an Island in the Saint Lawrence River. Many streets and addresses in Montréal are designated as East (Est) and West (Ouest). The dividing line between east and west is Saint Lawrence (Saint Laurent) often called The Main. Typically places east of Saint Lawrence are more in the French neighborhood, and places West of Saint Lawrence are more in the English neighborhood. However, the line is fuzzy and the linguistic identifications have more significance the farther away you go from Saint Lawrence. For those staying downtown or near the convention center, if you walk downhill you are generally going south towards the river and if you walk uphill you are generally going north towards Mount Royal, which is on the edge of the downtown area. So if you walk up Saint Lawrence you are going north in the Montréal grid (aside for those who use a compass or orient by the stars: this is not really correct since the Island of Montréal is not oriented North and South). For those who speak French, you can talk to people in French. However, in the downtown area

pretty much everyone understands English and you will not have any problems if you address people in English. If you address people in French, it would not be unusual to be answered in English unless you had a Québec accent.

Montréal is a safe city. Although there are occasional incidents, you will see that in most neighborhoods and the downtown area people are in the streets at pretty much any time. The mountain is safe for walking and jogging during daylight hours. To get around, there is an excellent Metro and bus service. You need exact change (cost is \$2.50 for a single ride on bus or metro). It's better to buy a strip of 6 tickets for \$11.00 at a metro station and some newsstands. Transfers are free. It is best to use Canadian money. Best rates are at currency exchanges in the downtown area.

Restaurants and Food

There are 3 classic regional specialties of Montréal and Québec.

1. **Smoked meat.** This is available lots of places but the best by far is *Schwartz'*. This is on the east side of St. Laurent. There is a unique atmosphere. Better ask for lean. Some also like *Ben's* (de Maissoneuve near Peel), but *Schwartz'* is more authentic.

2. **Bagels.** Montréal bagels are different. Here again there are lots of places that serve bagels, but quality differs. Two recommended places are on Fairmount Ave and St. Viateur. Both these streets intersect Park Avenue. Bagels tend to be freshly made any time you arrive and you can see them coming out of the wood burning ovens.
3. **Poutine.** A genuine Québec treat and unique to this area. French fries, curd cheese and chicken gravy. Tastes better than it sounds. There are lots of stores that sell this -- most have a nondescript look. Do not leave Montréal without sampling this since you probably will never see it anyplace else.

There are lots of restaurants. It may be unwise to select just a few favorites since you can generally find quite good food lots of places -- and if you are the sort who prefers to explore you might wish to start your searches near the St. Laurent and Milton intersection. However, some places are overpriced -- and too often French food does not measure up to standards expected by Europeans. Most places listed are in the downtown area. Since restaurants do go out of business, we cannot guarantee that all these restaurants still exist - but we think they do.

Here are some places that you might wish to try. All these offer excellent value for their price range. The dollar sign is a rough guide to price, but if your budget is limited you better check to make sure or look at the menu that almost always is posted outside the door. Alcohol is extra. You can generally dress informally even in the fanciest restaurants (the Ritz Carleton and

some private clubs are exceptions; do not be intimidated by businessmen on expense accounts who will always be dressed up). Tips and taxes are rarely included in the base price and usually add 30% to the food cost. Reservations may be needed at busy times.

\$(under \$20)

- *Santropol* (3990 rue St. Urbain - 284-9335) Great vegetarian food. Huge sandwiches with fruits and weird mixes.
- *Schwartz'* (3895 Blvd. St. Laurent - 842-4813) Smoked meat.
- *Arahova* (256 St. Viateur W. - 695-1110) Excellent souvlaki in informal atmosphere.
- *Kam Fung* (111 St. Urbain - 878-2888) In Chinatown. The place to go for Dim Sum at lunch. A huge place but it is real busy so arrive before noon.
- *Le Commensale* (3715 Queen Mary Road - 733-9755; 204 McGill College - 871-1480) Great vegetarian food by the gram. Many different ways to cook setan. Great desserts.
- *Pushap Sweets* 5195 Pare - 737-4527) Vegetarian Indian home cooked food and sweets in tiny nondescript neighborhood restaurant. Very cheap and worth searching for. A short metro ride away from Université de Montréal.
- *Buffet Maharaja* (1481 René Levesque Blvd. - 934-0655) All you can eat buffet and you could eat enough to last several days. This is

the site of the Division of Biological Physics reception on Wednesday March 24.

- *Guangzhou* (De la Gauchetière) Cantonese cooking. For those who feel that good Chinese restaurants should have Chinese menus on the wall, and no decor, this is the spot for you. Right in the middle of Chinatown, pretty near to the Convention Center. Cheap and very informal.

\$\$(\$20- \$50)

- *Fondumentale* (4325 St. Denis, near Rachel - 499-1446) Great fondues. Reservations needed.
- *L'Express* (3927 St. Denis - 845-5337) French bistro atmosphere. Many of the Québec broadcasters eat here. Real busy and reservations essential at normal dining hours. Interesting well prepared meals. As close as you come to Paris in Montréal.
- *Le Petit Extra* (1690 Ontario Est - 527-5552) French bistro atmosphere. Lively, noisy scene and good cooking. Out of the Montréal downtown area. Reservations recommended.
- *Thai Grill* (5101 St Laurent - 270-5566) Look your fish and shrimp in the face before they are grilled in unique Thai style.
- *Le Poisson Rouge* (1201 Rachel Street E. - 522-4876) This is in a neighborhood outside of the downtown area. Excellent chef and great value. This is a 'bring your

own wine' place so that will keep the costs down.

- *Le Pegase* (1831 Gilford - 522-0487) This is another neighborhood restaurant outside the downtown core with excellent French cuisine. It is also a 'bring your own wine' place with great value.

\$\$\$ (\$50 and up)

- *Les Halles* (1450 Crescent - 844-2328) This has the reputation as the best classic French restaurant in Montréal. Very expensive.
- *Passe Partout* (3857 Blvd. Decarie, Decarie 1 block south of the Villa Maria metro - 487-7750) Out of the downtown area. This place has about the best bread in Montréal and is run by some of the nicest people in Montréal. It was written up in the New York Times a few years back. It is in the back of a bakery. Very expensive.
- *Chez la Mère Michel* (1209 Guy - 934-0473) Quiet and elegant. Rated better than *Les Halles* by local food critics. Very expensive.
- *Toque!* (99 Place Jean Riopelle, between Viger and St. Antoine, east of the Convention Center - 499-2084) Perhaps the essential Montréal restaurant for visiting gourmets with lots of money who want to see Québec cooking with absolute flair. Reservations usually must be made days in advance, especially for weekends and at the main eating times.

Scenes

Here are some of the places you might like to visit. You should be able to find most of them pretty easily. The following either do not cost anything or are pretty cheap.

- *Mount Royal.* Find it by walking up hill from lots of places in the city. Find your way to Lac des Castors (Beaver Lake), the Cross, and the lookout over downtown Montréal. Very safe, but best to use only during daylight hours.
- *Tam Tam festival.* Every Sunday afternoon drummers gather in Mount Royal Park near the monument that is directly on Park Avenue near McGill University. If it is a nice day you might see crowds and hear noise as you get close. It is a pretty mellow scene, especially if you like drums and people watching.
- *Old Port.* This is the old city. It is scenic and is the only place in Montréal that some people visit. It is a bit touristy. There is a park sticking out into the river that has a somewhat industrial look. From it you can see across the Islands in the Saint Lawrence river. This is very near to the convention center.
- *Montréal Islands.* This is a nice place to walk or roller blade or bike or to visit a casino. There is a beach that has genuine filtered water from the St. Lawrence, but this won't be open in March. Ile Ste. Hélène metro stop.
- *Botanical Gardens.* Near the Olympic Stadium (metro Pie IX - pronounced "pee nuhf"). There are nice Japanese and Chinese Gardens and some good species in the Greenhouses. There is also an Insectarium where you can see the extremely large dead insects and some amazing living ones that look like leaves of trees. The Biodome is also nearby. See 4 ecological environments recreated in the former bicycle racing arena from the 1976 Olympics. The arctic environment is pretty neat -- you share the space with some arctic birds, fish and mammals. There are admission charges.
- *Bike paths.* There is a great bike path that starts out in the Old Port and goes down the Lachine Canal out to the City of Lachine. You can generally rent bikes or roller blades in the Old Port (not sure if this will be open yet). If you get down to Lachine and Park René Levesque you will be right next to the river. This is really nice, and you will see lots of Montréalers along the way.
- *Atwater market.* This is right near the Lionel Groulx metro stop. In late spring there is a riot of flowers and plants. A good place to buy maple syrup, rhubarb, cheese, cold cuts and seasonal vegetables.
- *Crescent Street. Saint Denis. Saint Laurent.* These are streets with lots of activity -- day and night. Stop in at a Café on Saint Denis and take in the local environment. Or stroll up St. Laurent, smell the different foods, and shop.
- *Museums.* There are lots of museums in Montréal. For Canadian art -- like

the famous Group of Seven or Inuit sculptures -- visit the fine arts museum at Sherbrooke and Musée. A unique museum is the Canadian Centre for Architecture -- located on René Lévesque Street a few blocks east of Atwater. This is notable for the incredible refined taste of Phyllis Lambert (née Bronfman) that is reflected in every detail of the building from the doorknobs to the windows. It's amazing what millions of dollars can do. This is one of the few architectural museums of the world. Definitely worth a visit.

- *Shopping.* Montréal is known for its underground city. This connects lots of the shopping malls downtown. If shopping is your thing -- you can get lost down there for days. However, the stores will be pretty familiar since many are the same chains you find elsewhere. There is also a warehouse district on the North end of Saint Laurent where there are probably lots of good buys. Remember, the Canadian dollar is worth about \$.76 US. A unique place is the Canadian Craft Guild store (1460 Sherbrooke west, 849-6091) near the museum. There is an excellent selection of Québec and Canadian and Aboriginal sculpture, prints, textiles, glass work, pottery -- all very nice and sometimes not too expensive.

Nightlife

When sensible people are going to sleep, segments of Montréal are waking up. You can check out clubs and happenings in one

of the free weeklies that can be found in lots of locations around Montréal - *Hour*, *Mirror*. The regular Montréal papers are also a good source for information but do not cover the whole scene. There is something for every taste.

There is lots of dance. Contemporary dance centers around *Tangente* (Cherrier near St. Denis). It is often a bit heavy on the angst and light on the smiles, but these ARE serious times. Modern Québec experimental theatre is perhaps best at *Usine C*. Most shows use local slang so understanding French is generally recommended. Local English theatre is represented by the *Centaur* on St. Francis-Xavier in Old Montréal and the *Sadie Bronfman Center Theater* in NDG neighborhood.

There are two excellent repertory movie theatres. The *Cinéma du Parc* (3575 Parc Avenue - in the shopping centre) has lots of high quality selections and cheap prices. *Ex Centris* on St. Laurent has great films and a unique ticket booth.

For those who like loud clubs, with lots of energy, pretty cheap entrance fees and beer, we recommend *Les Foufounes Electrique* -- North side of St. Catherine Street a couple of blocks east of St. Laurent. The neighborhood is a bit tacky so it's best to go with someone else. If *Foufounes* is too kinky, try *Cafe Campus*. If you like swing, check out *Jello (martini) Bar* (151 Ontario East). There are more standard pub type places in the Crescent Street area. *Hurley's Irish Pub* is about as close as Montréal comes to the misty isles and is highly valued by some graduate students.

Compiled by Leon Glass, from many sauces.



HUMAN FRONTIER SCIENCE PROGRAM (HFSP)

12 quai St. Jean, 67080 STRASBOURG Cedex, FRANCE

E-mail: grant@hfsp.org

Web site: <http://www.hfsp.org>

OPPORTUNITIES FOR INTERDISCIPLINARY RESEARCH

The Human Frontier Science Program (HFSP) supports basic research with emphasis placed on **novel, innovative** and **interdisciplinary** approaches to fundamental investigations in the life sciences, which involve scientific exchanges across national boundaries. Applications are invited for grants to support projects on **complex mechanisms of living organisms**.

CALL FOR LETTERS OF INTENT TO APPLY FOR A RESEARCH GRANT FOR AWARD YEAR 2005

The HFSP research grant program supports collaborative research involving biologists together with scientists from other disciplines such as chemistry, physics, mathematics, computer science and engineering in projects concerning the complex mechanisms underlying biological functions. Recent developments in the biological and physical sciences and new disciplines such as bioinformatics and nanoscience open up new approaches to understanding the mechanisms of living organisms. HFSP aims to stimulate novel, daring ideas and innovative approaches. Therefore, preliminary results are not required in research grant applications. Applicants are expected to develop new lines of research through the collaboration; projects must be distinct from applicants' other research funded by other sources. HFSP supports only international, collaborative teams, with an emphasis on encouraging scientists early in their careers. In recognition that it is often easier to establish a truly interdisciplinary collaboration within a single institution, applicants may establish a local interdisciplinary collaboration as a component of an international team.

International teams of scientists interested in submitting applications for support must first submit a letter of intent online via the HFSP web site. The guidelines for potential applicants and further instructions are available on the HFSP web site (www.hfsp.org).

Research grants provide 3 years support for basic research carried out jointly by research teams in different countries. The principal applicant must be located in one of the member countries* but co-investigators may be from any other country. Clear preference is given to intercontinental teams. The size of the team should be 2 – 4 members with not more than one member from any one country, unless more members are absolutely essential for the interdisciplinary nature of the project.

TWO TYPES OF GRANT ARE AVAILABLE:

Young Investigators' Grants are for teams of scientists who are all within 5 years of establishing an independent laboratory and within 10 years of obtaining their PhDs. Successful teams will receive up to \$450,000 per year for the whole team. Scientists involved in a local interdisciplinary collaboration are considered as 1.5 team members but only for budgetary purposes.

Program Grants are for independent scientists at all stages of their careers, although the participation of younger scientists is especially encouraged. Program grants provide up to \$450,000 per year for the whole team. Scientists involved in a local interdisciplinary collaboration are considered as a single team member but only for budgetary purposes.

Deadline for Letters of Intent: 31 MARCH 2004

*Current member countries include Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Luxembourg, the Netherlands, Portugal, the Republic of Ireland, Spain, Sweden, Switzerland, the United Kingdom and the United States.

MONDAY MORNING, 22 MARCH 2004, 08:00

Session A7. DBP/DCMP: [Mechanics of Self-Assembled Structures](#). *Rudnick, Powers, Schmidt, Phillips, Bausch*. 516C, Palais des Congres. Chair: Raymond Goldstein, University of Arizona.

Session A8. DBP: [Focus Session: Neutron Scattering and Other Studies of Phospholipids](#). *Katsaras, Root*. 510A, Palais des Congres. Chair: John Katsaras, National Research Council.

Session A9. DBP: [Proteins](#). 510B, Palais des Congres. Chair: Denis L. Rousseau, Albert Einstein College of Medicine.

Session A31. DPOLY/GSNP/DBP: [Focus Session: Charge Effects on Biomolecules](#). *Pollack*. 523AB, Palais de Congres. Chair: Erik Luijten, University of Illinois at Urbana-Champaign.

MONDAY MIDDAY, 22 MARCH 2004, 11:15

Session B4. DPOLY/DBP: [Ion Containing Polymers and Membranes](#). *Seery, Chow, Chakraborty, Marques, Safinya*. 517C, Palais des Congres. Chair: Ralph Colby, Penn State Univ.

Session B8. DBP: [Focus Session: Cellular Biomechanics I: Cell Motility, Actin, Networks](#). *Charon, Lee*. 510A, Palais des Congres. Chair: Linda Hirst, University of California at Santa Barbara.

Session B9. DBP: [Biomembranes and Ion Channels](#). 510B, Palais des Congres. Chair: Maria Kurnikova, Carnegie Mellon University.

Session B31. DPOLY/GSNP/DBP: [Focus Session: Charged Biomolecules in Complexes and on Surfaces](#). *Rondelez*. 523AB, Palais des Congres. Chair: Monica Olvera de la Cruz, Northwestern University.

MONDAY AFTERNOON, 22 MARCH 2004, 14:30

Session D7. DBP/DCMP: [Cutting Edge Techniques in Biological Physics](#). *Yeh, Austin, Mirkin, Grier, Durbin*. 516C, Palais des Congres. Chair: Denis L. Rousseau, Albert Einstein College of Medicine.

Session D8. DBP: [Cellular Biomechanics II: Rheology, Elasticity and Form](#). 510A, Palais des Congres. Chair: H. Daniel Ou-Yang, Lehigh University.

Session D9. DPOLY/GSNP/DBP: [Focus Session: Polyelectrolytes and Other Charged Systems](#). *Netz*. 510B, Palais des Congres. Chair: Christopher J. Barrett, McGill University.

TUESDAY MORNING, 23 MARCH 2004, 08:00

Session H8. DBP: [Cellular Biomechanics III: Motors and Fluidics](#). 510A, Palais des Congres. Chair: John C. Crocker, University of Pennsylvania.

Session H9. DBP: [Focus Session: Membranes and Bilayers](#). *Majewski, Lee*. 510B, Palais des Congres. Chair: Sunil K. Sinha, University of California at San Diego.

TUESDAY MIDDAY, 23 MARCH 2004, 11:15

Session J7. DBP: [Physics of Ion Interactions with Proteins](#). *Rasaiah, Coalson, Grubmuller, Roux, Jakobsson*. 516C, Palais des Congres. Chair: Bob Eisenberg, Rush University Medical Center.

Session J8. DBP: [Focus Session: Biochemical Networks I](#). *Tang, Ao*. 510A, Palais des Congres. Chair: Michael C. Mackey, McGill University.

Session J9. DBP: [Focus Session: General Methodologies and Techniques](#). 510B, Palais des Congres. Chair: Robert H. Austin, Princeton University.

TUESDAY AFTERNOON, 23 MARCH 2004, 14:30

Session L5. FIAP/DBP: [Development of Detectors/Sensors for Imaging Applications](#). *Tkaczyk, Saraf, Gregory, Street, Zhang*. 524AB, Palais des Congres. Chair: Alizadeh Azar, GE Global Research Center.

Session L8. DBP: [From Biological to Artificial Membranes](#). *White, Martin, Desai*. 510A, Palais des Congres. Chair: Syun-Ru Yeh, Albert Einstein College of Medicine.

Session L9. DBP: [Focus Session: Pattern Formation and Collective Phenomena I](#). *Showalter, Nihongi*. 510B, Palais des Congres. Chair: Frank Moss, University of Missouri at St. Louis.

TUESDAY EVENING, 23 MARCH 2004, 17:30

Session I8. DBP: [DBP Business Meeting](#). 510A, Palais des Congres.

WEDNESDAY MORNING, 24 MARCH 2004, 08:00

Session N8. DBP: [Focus Session: Biochemical Networks II](#). *Mackey*. 510A, Palais des Congres. Chair: Robert Eisenberg, Rush Medical Center.

Session N9. DBP: [Pattern Formation and Collective Phenomena II](#). 510B, Palais des Congres. Chair: Sonya Bahar, Weill-Cornell Medical College.

WEDNESDAY MIDDAY, 24 MARCH 2004, 11:15

Session P8. DBP: [Nucleic Acids I](#). 510A, Palais des Congres. Chair: Rahual Kulkarni, NEC Laboratories.

Session P9. DBP: [Pattern Formation and Collective Phenomena III](#). 510B, Palais des Congres. Chair: Ai Nihongi, University of Wisconsin, Milwaukee.

WEDNESDAY AFTERNOON, 24 MARCH 2004, 14:00

Session R1. Poster Session III.

Wednesday afternoon, 14:00, , Palais des Congres

WEDNESDAY AFTERNOON, 24 MARCH 2004, 14:30

Session S1. DCMP/DBP/DCOMP: [DCMP/DBP/DCOMP Prize Session](#). *Lubensky, Nelson, Cardy, Abraham, Wolynes*. 517A, Palais des Congres. Chair: Sid Nagel, University of Chicago.

Session S7. DBP: [Molecular Motors and the Physics of Cell Division](#). *Scholey, Sharp, Wilde, Jose*. 516C, Palais des Congres. Chair: Jonathan M. Scholey, University of California, Davis.

Session S8. DBP: [Nucleic Acids II](#). 510A, Palais des Congres. Chair: Daniel P. Aalberts, Williams College.

Session S9. DBP: [Focus Session: Stretching of Proteins.](#) *Cieplak, Thirumalai.* 510B, Palais des Congres. Chair: Charles Brooks III, Scripps Research Institute.

WEDNESDAY AFTERNOON, 24 MARCH 2004, 17:30

Session t8. DBP/DCMP: [Mechanics of Biological Cells and Cytoskeleton Protein Networks.](#) *Levine, Gardel, Ou-Yang, Hirst, Crocker.* 510A, Palais des Congres. Chair: David Sharp, Albert Einstein College of Medicine.

Session t9. DBP: [Interacting Biological Agents in Experiment and Theory.](#) *Levine, Couzin, Toner, Topaz, Erdmann.* 510B, Palais des Congres. Chair: Frank Moss, University of Missouri at St. Louis.

THURSDAY MORNING, 25 MARCH 2004, 08:00

Session U7. DBP: [Physics and Biology of Protein-DNA Interactions.](#) *Lavery, Sengupta, Stormo, Kulkarni.* 516C, Palais des Congres. Chair: Ned Wingreen, NEC Laboratories America, Inc.

Session U8. DBP: [Biomedical Physics I: Skin, bone, heart.](#) 510A, Palais des Congres. Chair: Michael X. Chen, Simon Fraser University.

Session U9. DBP: [Focus Session: Structure and Dynamics of Proteins.](#) *Rodriguez, Martinez.* 510B, Palais des Congres. Chair: Harold Scheraga, Cornell University.

THURSDAY MIDDAY, 25 MARCH 2004, 11:15

Session V8. DBP: [Focus Session: Synchronization and Phase Resetting in the Nervous System.](#) *Neiman, Tass.* 510A, Palais des Congres. Chair: Peter A. Tass, Research Center Juelich.

Session V9. DBP: [Biomolecular Computation.](#) 510B, Palais des Congres. Chair: Bernard Gerstman, Florida International University.

Session V10. DBP: [Focus Session: Physics in Physiology I.](#) *Jung, Glass.* 510C, Palais des Congres. Chair: Plamen Ch. Ivanov, Beth Israel Deaconess Medical Center.

THURSDAY AFTERNOON, 25 MARCH 2004, 14:30

Session W4. DBP/DCMP/GSNP: [Structure and Dynamics of Complex Networks](#). *Newman, Barabási, Strogatz, Kauffman*. 517C, Palais des Congres. Chair: Eivind Almaas, University of Notre Dame.

Session W7. DBP: [The Theory of Hydrogen Transfer Reactions in Biological Systems](#). *Hynes, Hammes-Schiffer, Brooks III, Schwartz, Gao*. 516C, Palais des Congres. Chair: Steven D. Schwartz, Albert Einstein College of Medicine.

Session W8. DBP: [Focus Session: Structure and Dynamics of DNA](#). *Lyubchenko, Ha*. 510A, Palais des Congres. Chair: Otto F. Sankey, Arizona State University.

Session W9. DBP: [Biomedical Physics II](#). 510B, Palais des Congres. Chair: Peter Jung, Ohio University.

Session W10. DBP: [Focus Session: Physics in Physiology II](#). *Suki, Collins*. 510C, Palais des Congres. Chair: Martin Huber, University of Marburg.

THURSDAY AFTERNOON, 25 MARCH 2004, 17:30

Session X8. DBP: [Teaching Biological Physics](#). *Goldstein, Bruinsma, Howard, Vogel, Nelson*. 510A, Palais des Congres. Chair: Raymond Goldstein, University of Arizona.

Session X9. DBP: [Physical Modeling of DNA Microarrays](#). *Held, Laderman, Bekiranov, SantaLucia Jr., Naef*. 510B, Palais des Congres. Chair: Li Zhang, University of Texas.

FRIDAY MORNING, 26 MARCH 2004, 08:00

Session Y8. DBP: [Focus Session: Biomolecules in Solution](#). *Scheraga, Goddard*. 510A, Palais des Congres. Chair: Jorge Rodriguez, Purdue University.

Session Y9. DBP: [Focus Session: Organismal Biomechanics](#). *Wang, Julicher*. 510B, Palais des Congres. Chair: J. Leo van Hemmen, TU Munich.

FRIDAY MIDDAY, 26 MARCH 2004, 11:15

Session Z7. DBP: [New Developments in Understanding Bacterial Chemotaxis.](#) *Cluzel, Tu, Othmer, Khan, Gestwicki.* 516C, Palais des Congres. Chair: Steven Schwartz, Albert Einstein College of Medicine.

Session Z8. DBP: [Focus Session: Novel surface-based techniques for biomolecules and biomolecular thin films.](#) *Johannsmann, Frank.* 510A, Palais des Congres. Chair: Ilya Reviakine, University of Houston.

Session Z9. DBP: [Focus Session: Materials Physics in Biology.](#) *Malkin.* 510B, Palais des Congres. Chair: Robert E. Thorne, Cornell University.

Session Z10. DBP: [Focus Session: Molecular Biology and Computation.](#) *Hwa, Weiss.* 510C, Palais des Congres. Chair: Terence Hwa, University of California at San Diego.

MONDAY MORNING, 22 MARCH 2004, 08:00

Session A7. DBP/DCMP: Mechanics of Self-Assembled Structures.

Monday morning, 08:00, 516C, Palais des Congres

08:00 [A7.001 Principles of virus self-assembly:NOTE:Alternatively, Robijn Bruinsma or Bill Gelbard, all of whom collaborated on this work. But I already proposed another invited session on with Bruinsma as a speaker, 'Teaching Biological Physics'](#)

Joe Rudnick (UCLA)

08:36 [A7.002 Theory of polymorphism in bacterial flagella](#)

Thomas Powers (Division of Engineering, Brown University)

09:12 [A7.003 Mechanics of microtubules and viral capsids](#)

Christoph F. Schmidt (Vrije Universiteit Amsterdam, Dept. Physics)

09:48 [A7.004 Mechanics of DNA Packing in Viruses](#)

Rob Phillips (California Institute of Technology)

10:24 [A7.005 Structure of self - assembled two-dimensional spherical crystals](#)

Andreas R. Bausch (Lehrstuhl fuer Biophysik E22, TU Muenchen, Germany)

Session A8. DBP: Focus Session: Neutron Scattering and Other Studies of Phospholipids.

Monday morning, 08:00, 510A, Palais des Congres

08:00 [A8.001 Small-Angle Neutron Scattering and Spontaneous Formation of Unilamellar Vesicles: Potential Vehicles for Drug Delivery](#)

John Katsaras (National Research Council)

08:36 [A8.002 Transition Temperatures of Phospholipid Bilayers Under Pressure](#)

T. A. Harroun, M.-P. Nieh, M. J. Watson (National Research Council, SIMS, Chalk River, Canada), V. A. Raghunathan (Raman Research Institute, Bangalore, India), G. Pabst (IBR, Austrian Academy of Sciences, Graz, Austria), M. R. Morrow (Department of Physics, Memorial University of Newfoundland, Canada), J. Katsaras (National Research Council, SIMS, Chalk River, Canada)

08:48 [A8.003 Structural Phase Behavior of Model Biomimetic Membranes -- ``Bicelles''](#)

M.-P. Nieh (NRC (Canada), SIMS, NPMR), V. A. Raghunathan (Raman Research Institute), M. Chakrapani, T. A. Harroun, J. Katsaras (NRC (Canada), SIMS, NPMR)

09:00 [A8.004 Monte Carlo simulation of lipid bicelle phase behavior](#)

Frank Y. Jiang, James T. Kindt (Department of Chemistry, Emory University)

09:12 [A8.005 Neutron Scattering: A Powerful and Versatile Methodology for Research on Bio, Soft and Nanophase Materials](#)

John H. Root (National Research Council)

09:48 [A8.006 Phase-sensitive Neutron Reflectometry Studies of a Biomineralization Peptide](#)

Ursula Perez-Salas, Susan Krueger (NIST), Wendy Shaw (Battelle Labs), Chuck Majkrzak, Norm Berk (NIST)

10:00 [A8.007 Single-Residue Sensitivity in Neutron Reflectivity and Resonant X-ray Reflectivity from Langmuir Monolayers of Synthetic Peptides](#)

Joseph Strzalka (Dept. of Chemistry, University of Pennsylvania), Sushil Satija (Center for Neutron Research, NIST), Elaine DiMasi (NSLS, Brookhaven National Lab), Ivan Kuzmenko, Thomas Gog (CMC CAT, APS, Argonne National Lab), J. Kent Blasie (U. Pennsylvania and CMC CAT)

10:12 [A8.008 X-ray reflectivity study of in situ polymerized phospholipid Monolayers](#)

Kwangmeyung Kim, Youngro Byun, Do Young Noh, Kwanwoo Shin (Dept. of Materials Science and Engineering, Kwangju Institute of Science and Technology, Gwangju, 500-712, Korea), Chulhee Kim (Dept. of Polymer Science and Engineering, Inha University, Incheon 402-751 Korea)

10:24 [A8.009 Collapse of Langmuir Monolayers Spread on Calcium Solutions: A hydrophobic dimer at the air-water interface](#)

Sam Dahlke (Ames Lab Iowa State University), Alex Travesset (Iowa State University and Ames Lab), David Vaknin (Ames Lab Iowa State University)

10:36 [A8.010 Dynamics of Pinned Biological Membranes](#)

Lawrence Lin (UCSB Department of Physics), Frank Brown (UCSB Department of Chemistry and Biochemistry)

Session A9. DBP: Proteins.

Monday morning, 08:00, 510B, Palais des Congres

08:00 [A9.001 The Compositional Adjustment of Amino Acid Substitution Matrices](#)

Yi-Kuo Yu, John Wootton, Stephen Altschul (National Center for Biotechnology Information, NLM, NIH)

08:12 [A9.002 Investigating the roles of dimensionality in the helix-coil transition in random walk protein models using the method of Lee-Yang zeros](#)

Apichart Linhananta (Department of Physics, Lakehead University)

08:24 [A9.003 How fast is protein stable from unfolded to folded state?](#)

Chia-Ching Chang, Po-Yen Lin, Xu-Chen Yeh (Dept. Physics, National Dong Hwa Univ. Taiwan)

08:36 [A9.004 Effects of Macromolecular Crowding on the Mechanical Unfolding of Ubiquitin](#)

Haibo Peng, Fan-chi Lin, Jian-Min Yuan, Guoliang Yang (Department of Physics, Drexel University, Philadelphia, PA 19104), Chia-Lin Chyan (Department of Chemistry, National Dong Hwa University, Hualien, Taiwan)

08:48 [A9.005 Studies on the Hydrogen Bonding Properties of Carboxylic and Amide Groups and Their Vibrational Spectral Markers for Structural Characterizations](#)

Beining Nie, Jerrod Stutzman, Lorand Kelemen, Aihua Xie (Department of Physics, Oklahoma State University, Stillwater, OK 74078)

09:00 [A9.006 Single Molecule Dynamics of Adenylate Kinase](#)

Lucas Watkins (Department of Chemistry, University of California, Berkeley), Haw Yang (Department of Chemistry, University of California, Berkeley, Biophysical Graduate Group, University of California, Berkeley, Lawrence Berkeley National Laboratory)

09:12 [A9.007 Low Frequency Light Scattering Spectroscopy of Lysozyme in Solution](#)

Alfons Schulte, Guo Yu (Department of Physics, University of Central Florida, Orlando, FL 32816-2385, USA), Wolfgang Doster, Ronald Gebhardt (Physik Department E13, Technische Universitaet Muenchen, D-85748 Garching, Germany)

09:24 [A9.008 Protein Thermodynamics from the 3D Topological Structure of the Native State](#)

Gregory Wood, Sargis Dallakayan, Donald Jacobs (Physics and Astronomy Department, California State University, Northridge CA 91330)

09:36 [A9.009 Can a Protein Function in the Crystalline State?](#)

Kelemen Lorand, Aihua Xie (Dept. of Physics, Oklahoma State Univ.), Wouter Hoff, Andrew Phillip (Dept. of Biochemistry amp; Mol. Biology, Univ. of Chicago)

09:48 [A9.010 Vibrational Characterization of NO Interaction with Heme Proteins](#)

JT Sage, WQ Zeng, BM Leu, GY Georgiev, DW Wharton (Northeastern Univ), W Sturhahn, EE Alp (Argonne Natl Lab)

10:00 [A9.011 Quantitative analysis of autophosphorylation of CaMKII](#)

Mee Choi, Julia Shifman, Stefan Mihalas, Mary Kennedy (California Institute of Technology)
10:12 [A9.012 Why are proteins charged molecules? The role of electrostatics in the stability, activity and processing of proteins](#)
Jeffrey Carbeck (Princeton University)
10:24 [A9.013 Sensitivity of Terahertz dielectric response to heme protein oxidation state](#)
Jing-Yin Chen, Joe Knab, John Cerne, Andrea Markelz (Physics Department, University at Buffalo)
10:36 [A9.014 Protein-Ligand Binding Detected by Terahertz Spectroscopy](#)
J. Knab, J.Y. Chen, M. Mader, A. Markelz (University at Buffalo, SUNY)
10:48 [A9.015 Kinetic Model for 1D aggregation of yeast "prions"](#)
Kay Kunes, Daniel Cox, Rajiv Singh (Dept of Physics, University of California Davis)
11:00 [A9.016 Protein Stability on gold nanospheres](#)
Jonathan H. Teichroeb, James A. Forrest (Department of Physics and Guelph-Waterloo Physics Institute, Waterloo, ON, Canada N2L 3G1)

Session A31. DPOLY/GSNP/DBP: Focus Session: Charge Effects on Biomolecules.

Monday morning, 08:00, 523AB, Palais de Congres

08:00 [A31.001 Counterions surrounding DNA: new measurements using anomalous x-ray scattering](#)
Lois Pollack (Cornell University)
08:36 [A31.002 Distribution of Counterions Near Discretely Charged Rods](#)
Mark L. Henle, Christian D. Santangelo, Deena M. Patel, Philip A. Pincus (Department of Physics, University of California, Santa Barbara)
08:48 [A31.003 Electrophoretic Mobility Measurements Suggest No Charge Inversion For A System of Charged Rods and Their Divalent Counterions](#)
Qi Wen, Jay Tang (Department of Physics, Brown University)
09:00 [A31.004 Direct observation of charge inversion by multivalent ions](#)
Koen Besteman, Marcel Zevenbergen, Hendrik Heering, Serge Lemay (Delft University of Technology, Department of Nanoscience), Molecular Biophysics Team
09:12 [A31.005 ION MEDIATED INTERACTIONS BETWEEN RANDOMLY CHARGED POLYPEPTIDE RODS](#)
Tommy E. Angelini (Physics, University of Illinois at Champaign-Urbana), Gerard C. L. Wong (Materials Science and Engineering, Physics and Bioengineering, University of Illinois at Champaign-Urbana), Enrico Bellomo (Materials Science and Engineering, University of California Santa Barbara), Jungyeon Hwang (Chemistry, University of California Los Angeles), Timothy Deming (Chemistry, Materials Science and Engineering, University of California Santa Barbara)
09:24 [A31.006 A comparison of co-ion and counterion behavior on condensed polyelectrolytes and condensed polyampholytes](#)
Olena Rudko, Thomas E. Angelini (Physics Dept., University of Illinois at Urbana-Champaign), Gerard C. L. Wong (Materials Science and Engineering Dept., University of Illinois at Urbana-Champaign)
09:36 [A31.007 Anomalous counterion condensation of hydrophobic polyelectrolytes](#)
Claudine Williams, Wafa Essafi, Damien Baigl, Physique des Fluides Organises Team
09:48 [A31.008 Thermoreversible crosslinking of polyelectrolyte chains](#)
Alexander Ermoshkin, Alexander Kudlay, Monica Olvera de la Cruz (Department of Materials Science and Engineering, Northwestern University, Evanston, IL 60208)
10:00 [A31.009 Manning Condensation: Beyond the Limiting Laws](#)

Qingbo Yang (Physics Department, Columbia University), Ben O'Shaughnessy (Chemical Engineering Department, Columbia University)

10:12 [A31.010 Accuracy Analysis and Systematic Improvements of the Generalized Born Solvation Model](#)

Grigori Sigalov, Alexey Onufriev (Virginia Tech)

10:24 [A31.011 Salt-induced Collapse and Reexpansion of Highly-Charged Flexible Polyelectrolytes](#)

Pai-Yi Hsiao, Erik Luijten (Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801)

10:36 [A31.012 New Distributed Multipole Methods for Accurate Electrostatics in Large-Scale Biomolecular Simulations](#)

Celeste Sagui, Christopher M Roland (North Carolina State University), Thomas A Darden (National Institute of Environmental Health Sciences)

10:48 [A31.013 The Generalized Born solvation model: What is it?](#)

Alexey Onufriev (Virginia Tech)

MONDAY MIDDAY, 22 MARCH 2004 11:15

Session B4. DPOLY/DBP: Ion Containing Polymers and Membranes.

Monday midday, 11:15, 517C, Palais des Congres

11:15 [B4.001 Dynamics of Sodium Poly\(styrenesulfonate\) in N-methyl Formamide](#)

Thomas Seery (University of Connecticut)

11:51 [B4.002 Electrophoresis of Ion Containing Polymers in Microfluidic Applications](#)

Andrea Chow (Caliper Technologies Corp.)

12:27 [B4.003 Intercellular Communication in the Adaptive Immune System](#)

Arup Chakraborty (Dept of Chemical Engineering and Dept of Chemistry, Univ of California at Berkeley)

13:03 [B4.004 Self-assembly of single charge diblock copolymers](#)

Carlos Marques (LDFC, 3 rue de l'Université, 67084 Strasbourg Cedex, FRANCE)

13:39 [B4.005 Supramolecular Assembly of Biomolecules](#)

Cyrus R. Safinya (Materials Department, Physics Department, Biomolecular Science and Engineering Program University of California, Santa Barbara, CA 93106 USA)

Session B8. DBP: Focus Session: Cellular Biomechanics I: Cell Motility, Actin, Networks.

Monday midday, 11:15, 510A, Palais des Congres

11:15 [B8.001 Spirochete motility and morphology](#)

Nyles Charon (West Virginia University)

11:51 [B8.002 Keratocyte Motility](#)

Juliet Lee (University of Connecticut)

12:27 [B8.003 Molecular Motion and Confined Polymers](#)

Andrey V. Dobrynin, Junhwan Jeon (Polymer Program, Institute of Materials Science, University of Connecticut, Storrs, CT 06269)

12:39 [B8.004 The mechanics of cell crawling](#)

Charles Wolgemuth (University of Connecticut Health Center), Alex Mogilner (University of California, Davis), George Oster (University of California, Berkeley)

12:51 [B8.005 Fingering Instabilities in Actin Gels](#)

Ariel Balter (Indiana University), Jay Tang (Brown University), Sebastian Wiesner (Max Planck Institute, Munich)

13:03 [B8.006 Actin polymerization in a gradient: Network structure and polymerization forces](#)

Andrew Pomerance, Matthew Ferguson (Institute for Research in Electronics and Applied Physics, University of Maryland, College Park), Jeffrey Urbach (Department of Physics, Georgetown University), Wolfgang Losert (Institute for Research in Electronics and Applied Physics, University of Maryland, College Park)

13:15 [B8.007 Dynamic Phase Transitions of Active Gels](#)

Hans-Guenther Doebereiner, Benjamin J. Dubin-Thaler, Gregory Giannone, Harry Xenias, Michael P. Sheetz (Department of Biology, Columbia University, New York, NY 10027)

13:27 [B8.008 Kinetics and Morphology of Living Polymer Systems](#)

Ajay Gopinathan (Dept. of Chemistry and Biochemistry, UCLA amp; Dept. of Physics, UCSB), J.M. Schwarz, Kun-Chun Lee, Andrea J. Liu (Dept. of Chemistry and Biochemistry, UCLA)

13:39 [B8.009 Local Nanomechanical Motion In Single Cells.](#)

Andrew Pelling, James Gimzewski (University of California, Los Angeles)

13:51 [B8.010 Dynamics of Actin Filament Ends in a Network](#)

Le Yang (Physics Department, Washington University, MO 63130), David Sept (BME Department, Washington University, MO 63130), Anders Carlsson (Physics Department, Washington University, MO 63130)

14:03 [B8.011 Chemotaxis in Microfluidic Devices](#)

Danica Wyatt, Sharvari Nadkarni, Loling Song, Camilla Voeltz, Eberhard Bodenschatz (Cornell University), Jun-Lin Guan Collaboration, William Loomis Collaboration

14:15 [B8.012 Actin Filament Growth: Non-Linear Kinetics and Large Fluctuations Near the Critical Concentration](#)

Ben O'Shaughnessy, Dimitrios Vavylonis (Chemical Engineering, Columbia University), Qingbo Yang (Physics, Columbia University)

Session B9. DBP: Biomembranes and Ion Channels.

Monday midday, 11:15, 510B, Palais des Congres

11:15 [B9.001 Ion Interactions with the Gramicidin Channel and Proton Interactions with the M2 Channel](#)

Timothy Cross (National High Magnetic Field Lab)

11:51 [B9.002 Opening Pores and Inserting Inclusions into Fluctuating Membranes](#)

Christian Santangelo (Department of Physics, University of California, Santa Barbara, CA), Oded Farago (Materials Research Laboratory, University of California, Santa Barbara, CA)

12:03 [B9.003 Large Scale Simulations of Phase Separation Dynamics in Two-Component Vesicles](#)

Mohamed Laradji (*Department of Physics, The University of Memphis, Memphis, TN 38117*), P.B. Sunil Kumar (*Department of Physics, IIT Madras, Chennai 600036, India*)

12:15 [B9.004 Phase Separation in Composite DPPC/DOPC Lipid Bilayers as determined from a Microscopic Model and Self-Consistent Field Theory](#)

Richard Elliott, Michael Schick (*Dept. of Physics, University of Washington, Seattle, WA 98195*)

12:27 [B9.005 Shape Deformation of Giant Unilamellar Vesicles \(GUVs\) Using a Laser Tweezer Array.](#)

Peter Bradford (*Department of Physics, University of Maryland*), Kenji Okamoto, Doug English (*Department of Chemistry, University of Maryland*), Wolfgang Losert (*Department of physics, IPST, IREAP, University of Maryland*)

12:39 [B9.006 Shape Selection in the Self-Assembly of Chiral Lipid Aggregates](#)

Robin Selinger (*Dept. of Physics, Catholic University*), Jonathan Selinger, Anthony Malanoski, Joel M. Schnur (*Center for Bio/Molecular Sci. amp; Eng., Naval Research Lab*)

12:51 [B9.007 Is the wrinkling transition a transition?](#)

Vinay Natrajan, Sahraoui Chaieb (*Department of Theoretical and Applied Mechanics, University of Illinois at Urbana Champaign, Urbana, Illinois- 61801, USA*)

13:03 [B9.008 Local Charge Distributions of Biomembranes](#)

Tiffany Metzger, Kezheng Chen, Olena Lopatiuk, Hongzhang Zhuang, Weili Luo (*Department of Physics, University of Central Florida*)

13:15 [B9.009 A New Length Scale for Hydration Repulsion Between Neutral Hydrophilic Surfaces](#)

Michael Dugdale, Michael Wortis (*Department of Physics, Simon Fraser University*)

13:27 [B9.010 Defect Structures in Hexatic Membranes with Topological Order](#)

Alex Travesset (*Iowa State University and Ames lab*), Mark Bowick (*Syracuse University*), David Nelson (*Harvard University*)

13:39 [B9.011 Topography of a wrinkled membrane](#)

Vinay Natrajan, Sahraoui Chaieb (*Department of Theoretical and Applied Mechanics, University of Illinois at Urbana-Champaign, Urbana, Illinois- 61801, USA*)

13:51 [B9.012 Pulling on adhered vesicles](#)

Ana-Suncana Smith, Stefanie Goennenwein, Barbara Lorz (*E22 Institut für Biophysik, Technische Universität München*), Udo Seifert (*II. Institut für Theoretische Physik, Universität Stuttgart*), Erich Sackmann (*E22 Institut für Biophysik, Technische Universität München*)

Session B31. DPOLY/GSNP/DBP: Focus Session: Charged Biomolecules in Complexes and on Surfaces.

Monday midday, 11:15, 523AB, Palais des Congres

11:15 [B31.001 Interactions of long DNA chains with charged surfaces: Entropy, Conformations and Applications](#)

Francis Rondelez (*Laboratoire de Physico Chimie Curie, Institut Curie, Paris, France*)

11:51 [B31.002 Electrostatically Stabilized Bundle Phases of Microtubules](#)

M. Ojeda-Lopez, D.J. Needleman, U. Raviv, H.P. Miller, L. Wilson, C.R. Safinya (*UCSB*)

12:03 [B31.003 Multivalent Lipid--DNA Complexes: Distinct DNA Compaction Regimes](#)

Heather M. Evans, A. Ahmad, K. Ewert, C.R. Safinya (*Departments of Materials, Physics, and Biomolecular Science and Engineering, UCSB, Santa Barbara, CA*)

12:15 [B31.004 An Electrostatic Model of Microtubule self assembly](#)

Justin Stambaugh, Heather Umberger, David Jones, Edward Ott, Wolfgang Losert (Department of Physics, University of Maryland)

12:27 [B31.005 Polyelectrolyte Flexibility Effect on the Morphology of Charged Lipid Multilayers](#)
Keunho Ahn, Sungyoung Yun, Mahn Won Kim (Korea Advanced Institute of Science and Technology, KOREA)

13:03 [B31.006 Preferred Curvature State of an Asymmetrically-Charged Lipid Bilayer](#)
Bae-Yeun Ha (Department of Physics, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada)

13:15 [B31.007 Interactions between anionic polyelectrolytes and anionic membranes](#)
Hongjun Liang (Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign), Thomas Angelini (Department of Physics, University of Illinois at Urbana-Champaign), Gerard Wong (Department of Materials Science and Engineering, Department of Physics, Department of Bioengineering, University of Illinois at Urbana-Champaign)

13:27 [B31.008 'Melting' of counterion density wave on biopolymer surfaces](#)
R Coridan, T Angelini, G C L Wong (Departments of Materials Science and Engineering, Physics, and Bioengineering, University of Illinois at Urbana-Champaign)

13:39 [B31.009 DNA Monolayers at Metal-Solution Interfaces](#)
Patrick Johnson, Youlei Weng, Gang Shen, Gaspar Anand, Rastislav Levicky (Chemical Engineering, Columbia University, NY, NY 10027), Young-soo Seo, Sushil Satija (National Institute of Standards and Technology, Gaithersburg, MD)

13:51 [B31.010 Interior versus surface solvation of ions --role of polarization](#)
Henry D Herce (North Carolina State University), Thomas Darden (National Institute of Environmental Health Sciences), Celeste Sagui (North Carolina State University)

14:03 [B31.011 Test-charge theory for the planar electric double layer](#)
Yoram Burak, David Andelman (School of Physics and Astronomy, Tel-Aviv University), Henri Orland (Service de Physique Theorique, CE-Saclay)

MONDAY AFTERNOON, 22 MARCH 2004,

14:30

Session D7. DBP/DCMP: Cutting Edge Techniques in Biological Physics. Monday afternoon, 14:30, 516C, Palais des Congres

14:30 [D7.001 A Cool Business: Trapping Intermediates on the submillisecond time scale](#)
Syun-Ru Yeh (Albert Einstein College of Medicine, Bronx, NY)

15:06 [D7.002 Sailing Against the Wind: Sorting without diffusion](#)
Robert H. Austin (Princeton University)

15:42 [D7.003 Going for the gold: Using Nanostructures for PCR-less Detection of Biomolecules.](#)
Chad A. Mirkin (Northwestern University)

16:18 [D7.004 Transforming Mesoscopic \(Bio\)materials with Holographic Optical Tweezers](#)
David Grier (Dept of Physics and Center for Soft Matter Research, New York University)

16:54 [D7.005 NRVS: synchrotron measurement of heme protein vibrational frequencies and applications to modeling functional dynamics](#)
Stephen M. Durbin (Purdue University)

Session D8. DBP: Cellular Biomechanics II: Rheology, Elasticity and Form.

Monday afternoon, 14:30, 510A, Palais des Congres

14:30 [D8.001 Motions of single protein filaments F-actin in the entangled isotropic networks and in the nematic liquid crystalline phase](#)

Jorge Viamontes (Brown University), Jay X. Tang (Affiliation)

14:42 [D8.002 Length Scale Dependence of Actin Rheology](#)

Jiayu Liu, Margaret Gardel (Department of Physics, Harvard University), Andreas Bausch (TU-Munich, Germany), David Weitz (Department of Physics, Harvard University)

14:54 [D8.003 Active and passive microrheology of living cells](#)

Gladys Massiera, Kathleen Miranda, Paul Biancaniello, John C Crocker (Chemical and Biomolecular Engineering University of Pennsylvania)

15:06 [D8.004 Optical Tweezing Nuclei in the Cellular Blastoderm of Drosophila Embryos](#)

Eva-Maria Schoetz, Paul M. Chaikin (Physics, Princeton University), Eric F. Wieschaus (Molecular Biology, Princeton University)

15:18 [D8.005 Constructing and probing biomimetic models of the actin cortex with holographic optical tweezers](#)

J. E. Curtis, C. Schmitz, J. P. Spatz (Biophysical Chemistry, Institute of Physical Chemistry, University of Heidelberg)

15:30 [D8.006 Viscoelastic Mapping of Living Cell Interiors](#)

Doris Heinrich, Erich Sackmann (Lehrstuhl fuer Biophysik E22, Technische Universitaet Muenchen, 85748 Garching, Germany), Jana Koehler, Guenther Gerisch (Max-Planck-Institut fuer Biochemie, 82152 Martinsried, Germany)

15:42 [D8.007 A Novel Approach to Measure the Forces Exerted by Cells on Elastic Substrates](#)

E Guan (Dept. of Materials Science, State University of New York, Stony Brook, NY 11790), Sravanesh Muralidhar, Kaustabh Ghosh, Richard Clark (Dept. of Biomedical Engineering, State University of New York, Stony Brook, NY 11790), Miriam Rafailovich, Jonathan Sokolov (Dept. of Materials Science, State University of New York, Stony Brook, NY 11790)

15:54 [D8.008 Collagen properties in biomineralized vertebrate tissues probed by liquid atomic force microscopy](#)

Recep Avci, Rob Boyd (Montana State University, Bozeman, MT), Mary Schweitzer, Jennifer Wittmeyer (North Carolina State University, Dept. of Marine, Earth and Atmospheric Sciences, Raleigh, NC), Fernando Teran Arce (Montana State University, Bozeman MT), Jorge Calvo (Museo de Geologia Palentologia, Universidad Nacional del Comahue, Neuquen, Argentina)

16:06 [D8.009 Local Mechanical Property and Adhesion Force Mapping of Living Fibroblast Cells Using an Atomic Force Microscope](#)

Shouren Ge, Jonathan Sokolov, Miriam Rafailovich (Department of Materials Science and Engineering, State University of New York at Stony Brook, Stony Brook, NY 11794), Kaustabh Ghosh, Richard A.F. Clark (Department of Biomedical Engineering, State University of New York at Stony Brook, Stony Brook, NY 11794)

16:18 [D8.010 Elasticity of Stiff Biopolymer Networks](#)

Jan Wilhelm, Erwin Frey (Hahn-Meitner-Institut)

16:30 [D8.011 A Numerical Study of Mechanics of Red Blood Cell Shapes and Shape Transformations](#)

Gerald Lim, Michael Wortis (Department of Physics, Simon Fraser University)

16:42 [D8.012 A simulational study of the non-linear elasticity of biopolymer gels](#)

Brian DiDonna, Tom Lubensky, Paul Janmey (University of Pennsylvania), Fred MacKintosh (Vrije Universiteit)

16:54 [**D8.013** The effect of cholesterol on the traction forces and the mechanical properties of endothelial cells.](#)

Helim Aranda-Espinoza (Bioengineering Department, University of Pennsylvania, Philadelphia, PA 19104), Fitzroy Byfield, Irena Levitan (Institute for Medicine and Engineering, University of Pennsylvania, Philadelphia, PA 19104), Daniel Hammer (Bioengineering Department, University of Pennsylvania, Philadelphia, PA 19104)

17:06 [**D8.014** Human Epithelial Cells Increase Their Rigidity with Ageing In-vitro: Direct Measurements](#)

Tamara Berdyeva (Dept of Physics, Clarkson University), Craig Woodworth (Dept of Biology, Clarkson University), Igor Sokolov (Dept of Physics, Clarkson University)

[**D8.015** Substrate amp; Cell Compliance Effects on Cell Spreading and Differentiation](#)

Dennis Discher, Maureen Sheehan, Adam Engler (Univ.Pennsylvania)

Session D9. DPOLY/GSNP/DBP: Focus Session: Polyelectrolytes and

Other Charged Systems.

Monday afternoon, 14:30, 510B, Palais des Congres

14:30 [**D9.001** Electrostatically driven complexation](#)

Roland Netz (Ludwig-Maximilians-Universitaet Munich, Theresienstr. 37, 80333 Munich, Germany)

15:06 [**D9.002** Counterion distribution in bundles of helically distorted actin](#)

Erik Luijten, Jae-Wook Lee (Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801)

15:18 [**D9.003** Mechanical and Structural Property Investigations of Weakly Charged Polyelectrolytes in Multilayer Assemblies](#)

Ozzy Mermut, Christopher Barrett (McGill University)

15:30 [**D9.004** Electrostatic self-assembly between oppositely charged rods and spheroids: F-actin – lysozyme interactions](#)

Lori K. Sanders (Materials Science and Engineering, University of Illinois Champaign-Urbana), Tommy E. Angelini (Physics, University of Illinois Champaign-Urbana), Scott C. Slimmer (Materials Science and Engineering, University of Illinois Champaign-Urbana), Wujing Xian (Materials Science and Engineering, University of Illinois Champaign-Urbana), Brian Matthews (Institute of Molecular Biology, University of Oregon at Eugene), Gerard C.L. Wong (Materials Science and Engineering, Physics, Bioengineering, University of Illinois Champaign-Urbana)

15:42 [**D9.005** Induced Nucleation of Polyelectrolyte-Surfactant Complexes at the air-Water Interface](#)

David Vaknin, Sam Dahlke (Ames Lab and Iowa State University), Shlomo Magdassi, Gilat Nizri (Hebrew University of Jerusalem), Alex Travesset (Iowa State University and Ames Lab)

15:54 [**D9.006** Grand Canonical Monte Carlo simulations of electrostatic forces in ordered polyelectrolyte systems](#)

Alexander Lyubartsev (Division of Physical Chemistry, Stockholm University, SE 10691 Stockholm Sweden), Lars Nordenskiöld (School of Biological Sciences, Nanyan Technological University, 637616 Singapore)

16:06 [**D9.007** Modifications of polyelectrolyte multilayers for molecular imprinting](#)

Solar C. Olugebefola, Michael F. Rubner, Anne M. Mayes (Massachusetts Institute of Technology), Department of Materials Science and Engineering Collaboration

16:18 [**D9.008** Molecular Dynamics Simulations of Protein-Polyelectrolyte Complexes](#)

Junhwan Jeon, Andrey Dobrynin (Polymer Program, Institute of Materials Science, University of Connecticut, Storrs, CT 06269)

16:30 [D9.009 E-Cadherin Binding Cooperativity Investigated Using Single Molecule Atomic Force Spectroscopy](#)

Robert Rudnitsky, Frauke Drees, W. James Nelson, Kenny Thomas, Stanford Nano-Biology Research Collaboration (Stanford University)

16:42 [D9.010 Electrostatic Interaction of Long DNA Molecules with Solid State Surfaces](#)

Bingquan Li, Vladimir Samuilov, Jonathan Sokolov, Miriam Rafailovich (Department of Materials Science, SUNY at Stony Brook, Stony Brook, NY), Ben Chu (Department of Chemistry, SUNY at Stony Brook, Stony Brook, NY)

16:54 [D9.011 Proton Affinity Changes Driving Vectorial Proton Transport in the Bacteriorhodopsin Photocycle](#)

Alexey Onufriev (Virginia Tech)

17:06 [D9.012 Electrostatic effects in the collapse transition of phospholiquid monolayer](#)

Toan T. Nguyen, Ajaykumar Gopal, Ka Yee C. Lee, Thomas A. Witten (The James Frank Institute, The University of Chicago)

17:18 [D9.013 Thermodynamics and Phase Transitions of Electrolytes on Lattices with Different Discretization Parameters](#)

Anatoly Kolomeisky (Rice University), Maxim Artyomov (Moscow State University), Vladimir Kobelev (University of Illinois at Urbana-Champaign)

[D9.014 Dynamical linker-driven evolution of F-actin morphology](#)

J.M. Schwarz (Dept. of Chemistry and Biochemistry, UCLA), Ajay Gopinathan (Dept. of Chemistry and Biochemistry, UCLA amp; Dept. of Physics, UCSB), Kun-chun Lee, Andrea J. Liu (Dept. of Chemistry and Biochemistry, UCLA)

TUESDAY MORNING, 23 MARCH 2004, 08:00

Session H8. DBP: Cellular Biomechanics III: Motors and Fluidics.

Tuesday morning, 08:00, 510A, Palais des Congres

08:00 [H8.001 Three state spatially symmetric Brownian ratchet](#)

Brian Geislinger, Ryoichi Kawai (University of Alabama at Birmingham)

08:12 [H8.002 Ratchet model for type IV pilus retraction](#)

Martin Lindén (Condensed Matter Theory, KTH, 106 91 Stockholm, Sweden), Tomi Tuohimaa (Biomedical and X-ray Physics, KTH, 106 91 Stockholm, Sweden), Ann-Beth Jonsson (Microbiology and Tumor Biology Center, Karolinska Institute, Box 280, 17177 Stockholm, Sweden), Mats Wallin (Condensed Matter Theory, KTH, 106 91 Stockholm, Sweden)

08:24 [H8.003 Dynamics of Molecular Motors on Heterogeneous Tracks](#)

Yariv Kafri (Harvard University), David K Lubensky (Bell Laboratories), David R Nelson (Harvard University)

08:36 [H8.004 STRUCTURAL DETERMINATION OF BIOMOLECULES IN MICROFLUIDIC SYSTEMS](#)

John C. Butler, Etienne Menard (Department of Materials Science and Engineering), John A. Rogers (Department of Materials Science and Engineering amp; Department of Chemistry, University of Illinois at Urbana Champaign), Gerard C. L. Wong (Department of Materials Science and Engineering, Department of Physics, Department of Bioengineering)

08:48 [H8.005 Bubble-driven microdevices for bioengineering](#)

Sascha Hilgenfeldt, Philippe Marmottant (Applied Physics, University of Twente, The Netherlands)

09:00 [H8.006 Experimental Evidence for Force Regulation in Tissue Dynamics](#)

X. G. Peralta, Y. Tokutake (Physics Department, Duke University), M. S. Hutson (Department of Physics and Astronomy, Vanderbilt University), S. Venakides (Mathematics Department, Duke University), D. P. Kiehart (Department of Biology, Duke University), G. S. Edwards (Physics Department, Duke University)

09:12 [H8.007 The Effects of Temperature Variation on the Intracellular Dynamics of Living Cells](#)

E.A. Rickter, L.A. Hough, Linda Lowe-Krentz, H.D. Ou-Yang (Lehigh University)

09:24 [H8.008 Electrical Impedance Study of Cultured Endothelial Cells Under Fluid Shear Stress](#)

Chunzhi Dong (Physics Department, Rensselaer Polytechnic Institute, Troy, NY 12180), Natacha DePaola (Biomed. Engineering, Rensselaer Polytechnic Institute, Troy, NY 12180), Charles R. Keese (Applied BioPhysics, Inc. Troy, NY 12180), Ivar Giaever (Physics Department, Rensselaer Polytechnic Institute, Troy, NY 12180)

09:36 [H8.009 Lubrication by the red microalgae *Porphyridium* sp. polysaccharide](#)

Delphine Gourdon (California NanoSystems Institute, UC Santa Barbara), Qi Lin (Department of Chemical Engineering, UC Santa Barbara), Yuval Golan (Department of Materials Engineering, Ben Gurion University of the Negev)

09:48 [H8.010 Tau Induces Cooperative Taxol Binding to Microtubules](#)

Jennifer Ross, Christian Santangelo (Physics Dept. University of California, Santa Barbara), Makrides Victoria (Molecular, Cellular, and Developmental Biology Dept. University of California, Santa Barbara), Deborah Fygenson (Physics Dept. University of California, Santa Barbara)

10:00 [H8.011 Investigating the Electrical Properties of Microtubules](#)

Allan MacDairmid, Jack Tuszynski, Mark Freeman (Department of Physics, University of Alberta, Edmonton, Canada), Silke Behrens (Institute of Technical Chemistry, FZ Karlsruhe, Karlsruhe, Germany), Eberhard Unger (Institute of Molecular Biotechnology, Jena, Germany)

10:12 [H8.012 Microtubules Buckling and Bundling under Osmotic Stress: A Synchrotron X-ray Diffraction Study Probing Inter-Protofilament Bond Strength](#)

D.J. Needleman, M. Ojeda-Lopez, K. Ewert, J.B. Jones, H.P. Miller, L. Wilson, C.R. Safinya (UCSB)

10:24 [H8.013 Orienting Paramecium with intense static magnetic fields](#)

Jr. Valles, Karine Guevorkian, Carl Quindel (Department of Physics, Brown University)

10:36 [H8.014 Using Magnetic Forces to Probe the Gravi-response of Swimming Paramecium](#)

Karine Guevorkian, Jr. Valles (Department of Physics, Brown University)

10:48 [H8.015 Signalling 'SELF' to phagocytes with adhesion proteins that turn off default engulfment](#)

Dennis Discher, Peter Photos, Shyam Subramanian, Ranganath Parthasarathy (Biophysical Eng'g Lab, Univ. Pennsylvania)

Session H9. DBP: Focus Session: Membranes and Bilayers.

Tuesday morning, 08:00, 510B, Palais des Congres

08:00 [H9.001 Studies of Biomembranes at Solid-Liquid Interfaces](#)

Jaroslav Majewski (LANSCE-12, Los Alamos National Laboratory)

08:36 [H9.002 Bell Curve for Transfection by Lamellar Cationic Lipid--DNA Complexes](#)

A. Ahmad, Heather M. Evans, K. Ewert, C.X. George, C.E. Samuel, C.R. Safinya (Departments of Materials, Physics, and Biomolecular Science and Engineering, UCSB, Santa Barbara, CA)

08:48 [H9.003 Lipids \$\hat{=}\$ Microtubule Supramolecular Assembly leads to Nanoscale Hierarchical Structures](#)

Uri Raviv, Daniel J. Needleman, Thomas Pfohl, Miguel Ojeda-Lopez (Materials and Physics, UCSB), Herbert P. Miller, Leslie Wilson (Molecular, Cellular and Developmental Biology, UCSB), Cyrus R. Safinya (Materials and Physics, UCSB)

09:00 [H9.004 Interaction of Dendritic Polymers with Synthetic Lipid and Cell Membranes](#)

Almut Mecke (Department of Physics, University of Michigan), Seungpyo Hong (Department of Chemistry, University of Michigan), Anna U. Bielinska (Center for Biologic Nanotechnology, University of Michigan), Mark M. Banaszak Holl (Department of Chemistry, University of Michigan), Bradford G. Orr (Department of Physics, University of Michigan), James R. Baker Jr. (Center for Biologic Nanotechnology, University of Michigan)

09:12 [H9.005 Interaction of Alzheimer's Amyloid Beta Peptide with Model Membranes](#)

Ka Yee C. Lee (Department of Chemistry, the Institute for Biophysical Dynamics amp; the James Franck Institute, The University of Chicago)

09:48 [H9.006 Cytoskeletal control of the red-blood cell membrane](#)

Nir Gov, Sam Safran (Weizmann Institute of Science)

10:00 [H9.007 Dance of little cholesterol: Local order and different diffusion mechanisms in DPPC-cholesterol bilayers](#)

Emma Falck (Laboratory of Physics, Helsinki University of Technology), Ilpo Vattulainen (Helsinki Institute of Physics and Laboratory of Physics, Helsinki University of Technology), Marja Hyvonen (Wihuri Research Institute, and Helsinki Institute of Physics and Laboratory of Physics, Helsinki University of Technology), Michael Patra, Mikko Karttunen

10:12 [H9.008 Evidence of Ordering in Lipid/Cholesterol Mixtures.](#)

Canay Ege (Department of Chemistry, the Institute for Biophysical Dynamics amp; the James Franck Institute, The University of Chicago, 5735 S. Ellis Avenue, Chicago, IL 60637), Maria K. Ratajczak (Department of Physics, the Institute for Biophysical Dynamics amp; the James Franck Institute, The University of Chicago, 5735 S. Ellis Avenue, Chicago, IL 60637), Jaroslaw Majewski (Manuel Lujan Jr. Neutron Scattering Center, Los Alamos National Laboratory, MS-H805, Los Alamos, NM 87545), Kristian Kjaer (Materials Research Department, Risø National Laboratory, Roskilde, Denmark), Ka Yee C. Lee (Department of Chemistry, the Institute for Biophysical Dynamics amp; the James Franck Institute, The University of Chicago, 5735 S. Ellis Avenue, Chicago, IL 60637)

10:24 [H9.009 Dipolar interactions could be important for the formation of lipid rafts on cell membranes](#)

Jian Liu (Department of Chemistry, UC-Berkeley), Shuyan Qi (Department of Chemical Engineering, UC-Berkeley), Arup K. Chakraborty (Departments of Chemical Engineering and Chemistry, UC-Berkeley)

10:36 [H9.010 Influence of chain-tilt on the phase behavior of phospholipid-cholesterol membranes.](#)

Sanat Karmakar, V. A. Raghunathan (Raman Research Institute, Bangalore 560 080, India.)

10:48 [H9.011 Rheology of Natural Lung Surfactant Films](#)

Coralie Alonso (University of California Santa Barbara), Alan Waring (University of California Los Angeles), Joseph Zsadzinski (University of California Santa Barbara)

11:00 [H9.012 Nuclear Envelopes Properties and Physical Interactions with Nucleoplasm](#)

Dennis Discher, Kris Dahl (Biophysical Eng'g. Lab, University of Pennsylvania), Kathy Wilson (Cell Biology, Johns Hopkins Univ. Medical School)

TUESDAY MIDDAY, 23 MARCH 2004, 11:15

Session J7. DBP: Physics of Ion Interactions with Proteins.

Tuesday midday, 11:15, 516C, Palais des Congres

11:15 [J7.001 Water Occupancy in Carbon Nanotubes and Hydrophobic Cavities](#)

Jayendran. C Rasaiah (Department of Chemistry University of Maine, Orono, ME 04469)

11:51 [J7.002 Modeling Ion Permeation through Protein Channels](#)

Rob Coalson (University of Pittsburgh)

12:27 [J7.003 Elucidating the mechanism of protein water channels by molecular dynamics simulations](#)

Helmut Grubmuller (Theoretical and Computational Biophysics Department, Max-Planck-Institute for Biophysical Chemistry, Gottingen, Germany)

13:03 [J7.004 Theoretical and computational models of biological ion channels](#)

Benoit Roux (Dept Biochemistry, Weill Med Coll, Cornell Univ)

13:39 [J7.005 Critical issues in multiscale simulation of ion channels](#)

Eric Jakobsson (University of Illinois at Urbana-Champaign)

Session J8. DBP: Focus Session: Biochemical Networks I.

Tuesday midday, 11:15, 510A, Palais des Congres

11:15 [J8.001 Global Dynamical Properties of the Yeast Cell Cycle Network](#)

Chao Tang (NEC Laboratories America, Princeton, NJ)

11:51 [J8.002 Finding regulatory modules from gene-expression data I](#)

Ned Wingreen (Department of Molecular Biology, Princeton University), Morten Kloster, Chao Tang (NEC Laboratories America, Inc.)

12:03 [J8.003 Finding regulatory modules from gene expression data II](#)

Chao Tang, Morten Kloster (NEC Laboratories America, Inc.), Ned Wingreen (Department of Molecular Biology, Princeton University)

12:15 [J8.004 In silico modeling of the yeast protein and protein family interaction network](#)

K.-I. Goh, B. Kahng, D. Kim (School of Physics, Seoul National University, Korea)

12:27 [J8.005 Quantitative Analysis of the Stability of Lysogenic State in Phage lambda](#)

Ping Ao (University of Washington)

13:03 [J8.006 Comparison of a model for protein synthesis with experimental data using statistical ensemble method for data fitting](#)

Leah Shaw, James Sethna (Cornell), Kevin Brown (Harvard), Kelvin Lee (Cornell)

Session J9. DBP: Focus Session: General Methodologies and Techniques.

Tuesday midday, 11:15, 510B, Palais des Congres

11:15 [J9.001 Harnessing Convective Flows as a Novel Platform for Biochemical Reactions and Transport](#)

Victor Ugaz (Texas Aamp;M University)

11:27 [J9.002 Silicon Technologies for Biological Diagnostics](#)

Rastislav Levicky, Jonida Basha, Lei Jin, Zhen Liu, Gang Shen (Chemical Engineering, Columbia University, New York, NY), George Patounakis, Kenneth Shepard (Electrical Engineering, Columbia University, New York, NY)

11:39 [J9.003 Biomimetic devices functionalized by membrane channel proteins](#)

Jacob Schmidt (UCLA)

11:51 [J9.004 An All-Electrical Switching and Control Mechanism for Actomyosin-Powered Nanoactuators](#)

Goran MihajloviÄ‡ (MARTECH and Department of Physics, Florida State University, Tallahassee, Florida 32306), Nicolas M. Brunet, Shanedah T. Williams (Department of Biological Sciences, Florida

State University, Tallahassee, Florida 32306), Jelena Trbović (MARTECH and Department of Physics, Florida State University, Tallahassee, Florida 32306), Lori A. McFadden, P. Bryant Chase (Department of Biological Sciences, Florida State University, Tallahassee, Florida 32306), Peng Xiong, Stephan von Molnár (MARTECH and Department of Physics, Florida State University, Tallahassee, Florida 32306)

12:03 [J9.005 A Nanosensor for Trans-membrane Capture and Identification of Single Nucleic Acid Molecules.](#)

Jonathan Nakane (University of British Columbia, Department of Physics and Astronomy), Matthew Wiggin (University of British Columbia, Department of Biochemistry), Andre Marziali (University of British Columbia, Department of Physics and Astronomy)

12:15 [J9.006 Protein Binding Studies with Zero Mode Waveguides](#)

K. Samiee, M. Foquet (Cornell University), E.C. Cox (Princeton University), H.G. Craighead (Cornell University)

12:27 [J9.007 High-Yield Cell Separations using Ferromagnetic Nanowires](#)

A. Hultgren, M. Tanase, E. J. Felton, C. S. Chen, D. H. Reich (Johns Hopkins University, Baltimore, MD)

12:39 [J9.008 Carbon-nanotube based field-emission X-ray system for biomedical imaging](#)

Jianping Lu, Jian Zhang, Yuan Cheng (Dept. of Physics and Astronomy, Univ. of North Carolina at Chapel Hill), Y. Lee, W.L. Lin (Department of Biomedical Engineering, Univ. of North Carolina at Chapel Hill), B. Gao (Applied Nanotechnologies, Inc., Chapel Hill, NC), D. Lalsuh (Bioinformatics Research Center, North Carolina State University), S. Dike, Otto Zhou (Curriculum in Applied and Materials Sciences, Univ. of North Carolina at Chapel Hill)

12:51 [J9.009 Velocity Mapping of Proteins via Space-Time Image Correlation Spectroscopy](#)

Benedict Hebert, Paul W. Wiseman (McGill University Dept. of Physics)

13:03 [J9.010 MICROSCOPY AND FLUORESCENCE RELOCALIZATION AFTER PHOTBLEACHING TO EXAMINE THE DYNAMIC PROPERTIES OF PROTEINS IN LIVING HUMAN CELLS](#)

Eric Nelson, Nicholas Watson, Ajaybindu Sabbineni, Bruce Alphenaar, W. Glenn McGregor (University of Louisville)

13:15 [J9.011 An Improved Tethered Particle Microscopy \(TPM\) Method for Single Molecule Studies.](#)

A. Gajraj, S. Blumberg, Y. Yu, J.-C. Meiners (University of Michigan)

13:27 [J9.012 Confocal Microscopy with Diode Lasers](#)

Nelson Sivars, Brian Van de Workeen (M. M. M. Laboratory, University at Albany "SUNY, Colonie, NY 12205), Donald Szarowski, James Turner (Wadsworth Center, NYS Dept. of Health, Albany, NY 12201), Susanne Lee (M. M. M. Laboratory, University at Albany "SUNY, Colonie, NY 12205)

13:39 [J9.013 Comparative Microscopic Imaging of Live Cells using Fluorescence, Oblique, Phase, and Laser Excitation Techniques](#)

Sylvie Landry, Peter McGhee (Northwestern Ontario Regional Cancer Centre, Thunder Bay, Ontario, Canada), Robert Girardin, Werden Keeler (Department of Physics, Lakehead University, Thunder Bay, Ontario, Canada)

13:51 [J9.014 A General Methodology for Quantifying Magnetic Susceptibility with MRI](#)

Lin Li, John S Leigh (Metabolic Magnetic Resonance Research and Computing Center (MMRCC), Department of Radiology, University of Pennsylvania)

14:03 [J9.015 Electrical Impedance Spectroscopy of Biological Cells](#)

Dharmakeerthi Nawarathna (University of Houston, Houston, TX USA), James Claycomb (Houston Baptist University), John Miller Jr. (University of Houston, Houston, TX USA)

TUESDAY AFTERNOON, 23 MARCH 2004, 14:30

Session L5. FIAP/DBP: Development of Detectors/Sensors for Imaging Applications.

Tuesday afternoon, 14:30, 524AB, Palais des Congres

14:30 [L5.001 X-ray Amorphous Silicon Detectors for Medical and Industrial Imaging](#)

J. Eric Tkaczyk (General Electric Research)

15:06 [L5.002 A Dynamic DNA Chip to obtain single spot inference](#)

Ravi Saraf (Chemical engineering, Virginia Tech)

15:42 [L5.003 IR Sensors for Imaging and Health Monitoring Applications](#)

Otto Gregory (Sensors and Surface Technology Partnership, Dept. of Chemical Engineering, University of Rhode Island)

16:18 [L5.004 Flat Panel Detectors for High Sensitivity X-ray Imaging](#)

Robert Street (Palo Alto Research Center, Palo Alto, CA 94304)

16:54 [L5.005 Recent Development of Terahertz Wave Tomographic Imaging](#)

Xi-Cheng Zhang (Rensselaer Poly Institute)

Session L8. DBP: From Biological to Artificial Membranes.

Tuesday afternoon, 14:30, 510A, Palais des Congres

14:30 [L8.001 How Membranes Shape Protein Structure](#)

Stephen White (Dept. of Physiology and Biophysics, University of California at Irvine)

15:06 [L8.002 DNA and Protein Transport in Synthetic Nanotube Membranes](#)

Charles R. Martin (University of Florida, Department of Chemistry, Gainesville, FL32611)

15:42 [L8.003 Nanoporous inorganic membranes for bioseparation and drug delivery.](#)

Tejal A. Desai (Boston University)

16:18 [L8.004 Sensing DNA Molecules and Configurations in Solid State Nanopores](#)

Golovchenko Jene (Harvard University, Lyman Laboratory of Physics, Cambridge, MA 02138)

Session L9. DBP: Focus Session: Pattern Formation and Collective Phenomena I.

Tuesday afternoon, 14:30, 510B, Palais des Congres

14:30 [L9.001 Feedback Stabilization and Control of Unstable Propagating Waves](#)

Kenneth Showalter (West Virginia University)

15:06 [L9.002 Dual-frequency spirals in reaction-diffusion media](#)

Annette Taylor, Gavin Armstrong, Rita Toth, Netta Cohen (University of Leeds), Silvia De Monte (University of Copenhagen)

15:18 [L9.003 SELF-INDUCED OSCILLATIONS IN COUPLED OVERDAMPED BISTABLE SYSTEMS](#)

Visarath In, Andy Kho, Adi Bulsara (SPAWAR Systems Center San Diego, Code 2363, 53560 Hull Street, San Diego, CA 92152, USA), Antonio Palacios (Nonlinear Dynamics Group, Department of Mathematics and Statistics, San Diego State University, San Diego, CA 92182, USA), Salvatore Baglio, Bruno Ando (Dipartimento Elettrico Elettronico e Sistemistico, University of Catania, V.le A. Doria 6, 95125, Catania, Italy), Patrick Longhini (Nonlinear Dynamics Group, Department of Mathematics and Statistics, San Diego State University, San Diego, CA 92182, USA), Joseph Neff, Brian Meadows (SPAWAR Systems Center San Diego, Code 2363, 53560 Hull Street, San Diego, CA 92152, USA)

15:30 [L9.004 Turing patterns in simple models for biogeochemical processes in marine sediments](#)

Ulrike Feudel, Martin Baurmann, Wolfgang Ebenhöh (Institute for Chemistry and Biology of the Marine Environment, Carl von Ossietzky University Oldenburg, Germany)

15:42 [L9.005 Small zooplankton sensing their environment: feeding, mating, and predator avoidance](#)

Ai Nihongi (Great Lakes WATER Institute, University of Wisconsin - Milwaukee)

16:18 [L9.006 Bioconvective Plumes and Bacterial Self-Concentration at a Slanting Meniscus](#)

Christopher Dombrowski, Sunita Chatkaew, Raymond Goldstein, John Kessler (University of Arizona)

16:30 [L9.007 Large-Scale Coherence in Concentrated Bacterial Suspensions](#)

Luis Cisneros, Christopher Dombrowski, Raymond Goldstein, John Kessler (University of Arizona)

16:42 [L9.008 Action Potential and Conduction Velocity Restitution in Cardiac Tissue](#)

Hana Dobrovolny (Department of Physics, Duke University), Robert Oliver, Soma Sau (Department of Biomedical Engineering, Duke University), Elena Tolkacheva (Department of Physics, Duke University), David Schaeffer (Department of Mathematics, Duke University), Wanda Krassowska (Department of Biomedical Engineering, Duke University), Daniel Gauthier (Departments of Physics and Biomedical Engineering, Duke University)

16:54 [L9.009 Reactor-Diffusion Models For Cartilage Pattern Formation](#)

Tilmann Glimm, H.G.E. Hentschel (Emory University)

17:06 [L9.010 Addressable Excitable Media for Modeling Disease Spreading](#)

Mark Tinsley, Jianxia Cui, Florin Chirila, Eugene Mihaliuk, Kenneth Showalter (West Virginia University)

17:18 [L9.011 Dynamic Patterns of Modern Epidemics](#)

Dirk Brockmann, Lars Hufnagel, Theo Geisel (Max-Planck-Institut für Strömungsforschung)

17:30 [L9.012 Dynamics and Rheology of Active-Particle Suspensions](#)

Yashodhan Hatwalne (Raman Research Institute, C.V. Raman Avenue, Bangalore 560 080 INDIA), Sriram Ramaswamy (Centre for Condensed Matter Theory, Department of Physics, Indian Institute of Science, Bangalore 560 012 INDIA), Madan Rao (Raman Research Institute, C.V. Raman Avenue, Bangalore 560 080 INDIA), R. Aditi Simha (MPI-PKS, Noethnitzer Str. 38, 01187 Dresden, Germany)

[L9.013 Pattern formation in a drying droplet of DNA](#)

Olena Rudko (Physics Dept., University of Illinois at Urbana-Champaign), John C. Butler, Gerard C. L. Wong (Materials Science and Engineering Dept., University of Illinois at Urbana-Champaign)

TUESDAY EVENING, 23 MARCH 3904

Session 18. DBP: DBP Business Meeting.

Tuesday Evening, 17:30, 510A, Palais des Congres

WEDNESDAY MORNING, 24 MARCH 2004, 08:00

Session N8. DBP: Focus Session: Biochemical Networks II. Wednesday morning, 08:00, 510A, Palais des Congres

08:00 [N8.001 Mathematical Models of Gene Regulation](#)

Michael C. Mackey (McGill University, Department of Physiology)

08:36 [N8.002 An approach for in vitro genetic networks assembly](#)

Vincent Noireaux (The Rockefeller University, New York, NY 10021), Roy Bar-Ziv (The Weizmann institute of Science, Rehovot, 76100, Israel), Albert Libchaber (The Rockefeller University, New York, NY 10021), Libchaber lab Team

08:48 [N8.003 Regulation and Fluctuation of a Genetic Element at the Single-Cell Level](#)

Nitzan Rosenfeld (Weizmann Institute), Peter Swain (McGill University), Uri Alon (Weizmann Insititute), Michael Elowitz (Caltech)

09:00 [N8.004 Identifying genetic networks in noisy and varied experimental data: The circadian clock in *Arabidopsis thaliana*](#)

James Locke (Department of Physics), Andrew J. Millar (Department of Biology), Matthew S. Turner (Department of Physics, Warwick University, Coventry CV4 7AL, UK)

09:12 [N8.005 The role of over-represented network motifs in noisy signal transmission](#)

Gabor Balazsi, Radu Dobrin (Northwestern University Medical School, Chicago, IL 60611), Barabasi Albert-Laszlo (University of Notre Dame, Notre Dame, IN 46556), Zoltan Oltvai (Northwestern University Medical School, Chicago, IL 60611)

09:24 [N8.006 Network structure controls noise](#)

Jayajit Das, Subhadip Raychaudhuri (University of California, Berkeley)

09:36 [N8.007 Identification of lethal reactions in the *Esherichia coli* metabolic network: Graph theory approach](#)

C.-M. Ghim, K.-I. Goh, B. Kahng, D. Kim (School of Physics, Seoul National University, Korea)

09:48 [N8.008 Alternative designs of simple genetic switches](#)

N.E. Buchler (Rockefeller University), T. Hwa (University of California, San Diego)

10:00 [N8.009 Information-theoretic measures of biological network modularity](#)

Chris Wiggins (Department of Applied Physics and Applied Mathematics; Center for Computational Biology and Bioinformatics, Columbia University), Manuel Middendorf (Department of Physics, Columbia University), Etay Ziv (College of Physicians and Surgeons; and Department of Biomedical Engineering, Columbia University)

10:12 [N8.010 Patterning the fly's eye: How to make a hexagonal lattice with genes](#)

David Lubensky (BioMaPS Institute, Rutgers University), Boris Shraiman (BioMaPS Institute and Physics Dept., Rutgers University)

Session N9. DBP: Pattern Formation and Collective Phenomena II. Wednesday morning, 08:00, 510B, Palais des Congres

08:00 [N9.001 Delayed Random Walk with a Repulsive Origin](#)

Tadaaki Hosaka (Tokyo Institute of Technology), Toru Ohira (Sony Computer Science Laboratories), John G. Milton (Dept. of Neurology, University of Chicago), Juan Luis Cabrera (Laboratorio de Fisica Estadistica, Centro de Fisica)

08:12 [N9.002 Numerical studies of bacterial-carpet microflows](#)

Greg Huber, Dan Tillberg (University of Massachusetts, Boston and Amherst), Thomas R. Powers (Brown University)

08:24 [N9.003 Avoidance](#)

Ricardo Garcia (University of Missouri at St. Louis), Elizabeth Caspari (Computerized Medical Systems, Inc.), Anke Ordemann (University of Missouri at St. Louis), Frank Moss (University of Missouri at St. Louis)

08:36 [N9.004 Population variability in the Active Brownian Particle model of Daphnia motions](#)

Frank Moss (University of Missouri at St. Louis), Udo Erdmann, Lutz Schimansky-Geier (Humboldt University in Berlin, Germany), Anke Ordemann (University of Missouri at St. Louis)

08:48 [N9.005 Noise induced coherent motion of colloid particles with hydrodynamic interaction](#)

Udo Erdmann (Institute of Physics, Humboldt-University Berlin, Newtonstr. 15, 12489 Berlin, Germany), Benjamin Lindner (Physics Department University of Ottawa 150 Louis Pasteur, Ottawa, Ontario Canada K1N 6N5)

09:00 [N9.006 Models of self-organization of microtubules under the influence of gravitational fields](#)

Stephanie Portet (SLRI, Mount Sinai Hospital, University of Toronto, Canada), Jack Tuszynski (Department of Physics, University of Alberta, Canada), John Dixon (Department of Physics, University of Warwick, UK)

09:12 [N9.007 The Knowledgeable Hungry Walker model: a description of primate foraging behavior](#)

Denis Boyer (National University of Mexico), Gabriel Ramos-Fernández (Pronatura Peninsula de Yucatan), Octavio Miramontes, Jose-Luis Mateos, Germinal Cocho, Hernán Larralde (National University of Mexico)

09:24 [N9.008 Hydrodynamic interactions and swarming of water fleas](#)

Bruno Eckhardt, Juergen Vollmer (Philipps-Universität Marburg), Attila Gergely (Babes-Bolyai University of Cluj, Rumania)

09:36 [N9.009 Passive Particle Dynamics in Active Bacterial Baths](#)

Daniel T.N. Chen, Andy W.C. Lau, Tom C. Lubensky, Arjun G. Yodh (Department of Physics and Astronomy, University of Pennsylvania)

09:48 [N9.010 A microscopic derivation of the hydrodynamic of active polymer solutions](#)

M. Cristina Marchetti (Syracuse University), Tanniemola B. Liverpool (University of Leeds)

10:00 [N9.011 Accurate Cell Division in Bacteria: How Does a Bacterium Know Where its Middle Is?](#)

Martin Howard (Imperial College London), Andrew Rutenberg (Dalhousie University)

10:12 [N9.012 Modeling spatial oscillations of Min proteins in round bacteria](#)

Kerwyn Huang (Department of Physics, Massachusetts Institute of Technology), Ned Wingreen (Department of Molecular Biology, Princeton University)

10:24 [N9.013 A new model for Min protein oscillation in *Escherichia coli* and a comparison between existing models](#)

Simon de Vet, Andrew Rutenberg (Dalhousie University)

10:36 [N9.014 Scaling law for Dictyostelium Discoideum mounds](#)

Camilla Voeltz, Eberhard Bodenschatz (LASSP, Cornell University, Ithaca, NY)

10:48 [N9.015 Bacterial Interaction with Hydrophobic and Hydrophilic Interfaces](#)

Laura Pedri, Sophie Itier, Heidi Schraft (Lakehead University), Margaret Hawton (Lakehead University, Thunder Bay ON Canada)

11:00 [N9.016 Pattern formation in cell membrane adhesion](#)

Dennis Discher, A Hategan (Univ. Pennsylvania), K Sengupta, E Sackmann (Technical University of Munich)

WEDNESDAY MIDDAY, 24 MARCH 2004, 11:15

Session P8. DBP: Nucleic Acids I.

Wednesday midday, 11:15, 510A, Palais des Congres

11:15 [P8.001](#) [A possible origin of semiconducting DNA and effects of Anderson localization in transport properties](#)

Hiiori Kino (National Institute for Materials Science (NIMS)), Masaru Tateno (National Institute of Advanced Industrial Science and Technology (AIST)), Mauro Boero (Univ. Tsukuba), Jose Torres (National Institute of Advanced Industrial Science and Technology (AIST)), Takahisa Ohno (National Institute for Materials Science (NIMS)), Kiyoyuki Terakura (Hokkaido Univ.), Hidetoshi Fukuyama (Tohoku Univ.)

11:27 [P8.002](#) [Inter-base Electronic Coupling for transport through DNA](#)

Hatem Mehrez, M. P. Anantram (Center for NanoTechnology, NASA Ames Research center, Moffett Field, CA 94035-1000, USA)

11:39 [P8.003](#) [Current-voltage characteristics of double stranded versus single stranded DNA molecules](#)

B. Hartzell, Hong Chen, J.J. Heremans, B. McCord, V. Soghomonian (Ohio University, Athens, OH 45701)

11:51 [P8.004](#) [Role of Guanine in Electron Transmission through DNA](#)

Supratim Ray, Shirley Daube (Affiliation), Ron Naaman (Dep. of Chemical Physics, Weizmann Institute)

12:03 [P8.005](#) [Electronic properties of O₂ doped DNA](#)

H. Mehrez, S. P. Walch, M. P. Anantram (NASA Ames Research center, Moffett Field, CA 94035-1000, USA)

12:15 [P8.006](#) [Dependence of electronic properties of a DNA molecule on the positions of an H atom](#)

D. L. Cox, C. Y. Fong, M. C. Qian, R. R. P. Singh (Department of Physics, UC Davis), R. Endres (Oak Ridge National Laboratory)

12:27 [P8.007](#) [Small polarons in dry DNA](#)

Helio Chacham, Simone S. Alexandre (Universidade Federal de Minas Gerais, Brazil), Jose M. Soler (Universidad Autonoma de Madrid, Spain), Emilio Artacho (University of Cambridge, UK)

12:39 [P8.008](#) [Integral cross sections for electronic excitation of thymine by low-energy electron \(6-12 eV\) impact](#)

Pierre L. Levesque, Marc Michaud, Wonseok Cho, Leon Sanche (Universite de Sherbrooke)

12:51 [P8.009](#) [Temperature dependence of electrical capacitance on DNA solutions](#)

K.E. Kim, S.K. Lee, Sunbae Lee, K.-H. Yoo (Department of Physics, Yonsei University, Seoul 120-749, Korea)

13:03 [P8.010](#) [Direct measurement of torque and twist generated by a dye binding to DNA](#)

Jeff Gore (Department of Physics, University of California, Berkeley), Zev Bryant (Department of Molecular and Cell Biology, University of California, Berkeley), Carlos Bustamante (Department of Physics and Molecular and Cell Biology, University of California, Berkeley, Howard Hughes Medical Institute)

13:15 [P8.011](#) [Tiny wind-up toys: applications of torque and twist measurements on single DNA molecules](#)

Zev Bryant (Department of Molecular and Cell Biology, University of California, Berkeley, CA 94720), Jeff Gore (Department of Physics, University of California, Berkeley, CA 94720), Michael D. Stone (Department of Molecular and Cell Biology, University of California, Berkeley, CA 94720), Steven B. Smith (Department of Physics, University of California, Berkeley, CA 94720), Nicholas R. Cozzarelli (Department of Molecular and Cell Biology, University of California, Berkeley, CA 94720), Carlos Bustamante (Departments of Molecular and Cell Biology and Physics and Howard Hughes Medical Institute, University of California, Berkeley, CA 94720)

13:27 [P8.012 Influence of ac electrokinetic forces and torque on the elongation of immobilized DNA](#)

Christoph Walti, W. A. Germishuizen, P. Tosch, R. Wirtz, A. P. J. Middelberg, M. Pepper (University of Cambridge), A. G. Davies (University of Leeds)

13:39 [P8.013 The pulling force of a single DNA molecule condensed by spermidine](#)

Rui Zhang (Department of Physics, University of Minnesota), Boris Shklovskii (William I. Fine Theoretical Physics Institute, University of Minnesota)

13:51 [P8.014 Kinetics of DNA Helix-Destabilization by 32 Protein Studied by Single DNA Molecule Stretching](#)

Ioulia Rouzina (University of Minnesota), Richard Karpel (University of Maryland), Kiran Pant, Mark Williams (Northeastern University), I.Rouzina Collaboration, Karpel's lab Collaboration, M.C. William's lab Collaboration

14:03 [P8.015 Intermolecular Proton Transfer Induced by Excess Electron Attachment to Pyrimidine Nucleic Acid Bases and Breaks of Sugar-Phosphate Bond in Nucleotides](#)

Maciej Gutowski (Chemical Sciences Division, Pacific Northwest National Laboratory, Richland, WA 99352), Iwona Dabkowska, Rafal Bachorz, Maciej Haranczyk, Janusz Rak (Department of Chemistry, University of Gdansk, 80-952 Gdansk, Poland), Dunja Radisic, Sarah Stokes, Michael Nilles, Kit Bowen (Department of Chemistry, Johns Hopkins University, Baltimore, MD 21218), PNNL Collaboration

Session P9. DBP: Pattern Formation and Collective Phenomena III. Wednesday midday, 11:15, 510B, Palais des Congres

11:15 [P9.001 Nonlinear high-order mode locking in stochastic sensory neurons](#)

Michael Rowe (Neuroscience program, Department of Biological Sciences, Ohio University), Muhammad Afghan, Alexander Neiman (Department of Physics and Astronomy, Ohio University)

11:27 [P9.002 Spatial analysis of phase synchronization from EEG recordings](#)

Jorge Brea (University of Missouri at St. Louis), R. Edward Hogan (St. Louis University Hospital), Alexander Neiman (Ohio University), Frank Moss (University of Missouri at St. Louis)

11:39 [P9.003 Manipulating Traveling Brain Waves with Electric Fields: From Theory to Experiment.](#)

Bruce J. Gluckman (George Mason University), Kristen Richardson, Steven J. Schiff

11:51 [P9.004 Synchrony and clustering in heterogeneous networks with global coupling and parameter dispersion.](#)

Collins Assisi, Viktor Jirsa, J. A. Scott Kelso (Center for Complex Systems and Brain Sciences, Florida Atlantic University)

12:03 [P9.005 Analyzing spike trains with circular statistics](#)

Daisuke Takeshita (University of Missouri at St. Louis), John T. Gale (Kent State University), Erwin B. Montgomery Jr (University of Wisconsin - Madison), Alexander Neiman (Ohio University), David Russell, Frank Moss (University of Missouri at St. Louis)

12:15 [P9.006 Natural evolution, disease, and localization in the immune system](#)

Michael Deem (Rice University)

12:27 [P9.007 Computing with Chaos](#)

K. Murali (Department of Physics, Anna University, Chennai 600 025, India), Sudeshna Sinah (Institute of Mathematical Sciences, Taramani, Chennai 600 113, India), William Ditto (Department of Biomedical Engineering, University of Florida, Gainesville, FL, 326611-6131, USA)

12:39 [P9.008 The effects of initial distribution on the formation and structure of conducting paths in a physical example of a resource transportation network](#)

Joseph Jun, Alfred Hubler (Department of Physics, University of Illinois at Urbana-Champaign), Center for Complex Systems Research Team

12:51 [P9.009 Oxygen Transport Across Space-Filling Biological Membranes](#)

Chen Hou, Peter Pfeifer (Department of Physics, University of Missouri, Columbia, MO 65211)

13:03 [P9.010 Self-organized protein and lipid patterns at inter-membrane junctions](#)

Raghuveer Parthasarathy, Jay T. Groves (Dept. of Chemistry, University of California at Berkeley)

13:15 [P9.011 Control of cell morphology through protein organization on Au/Si micropatterns](#)

Nadine Pernodet, Lenny Slutsky, John Jerome, Miriam Rafailovich (Materials Science, SUNY, Stony Brook, NY)

13:27 [P9.012 Cell Responses to Patterned Surfaces from Micro- to Nano-scale topography](#)

Madelyn Ho, Lenny Slutsky, Miriam Rafailovich, Nadine Pernodet (SUNY, Stony Brook)

13:39 [P9.013 Collagen Triple Helix Polymorphism and Material Morphology](#)

Regina Valluzzi, Reena Desai (Tufts University Department of Chem and Biol Engineering), Peggy Cebe (Tufts University Department of Physics)

13:51 [P9.014 Is Bacteriophage Adsorption Anomalous?](#)

Radu Moldovan, X.L. Wu (Dept. of Physics, University of Pittsburgh)

[P9.015 Thermodynamic stability of ecosystems](#)

Karo Michaelian (Instituto de Fisica, Universidad Nacional Autonoma de Mexico, A.P. 20-364, 01000 Mexico D.F., Mexico)

WEDNESDAY AFTERNOON, 24 MARCH 2004, 14:30

Session R1. Poster Session III.

Wednesday afternoon, 14:00, , Palais des Congres

[R1.072 Nanodosimetry of Low Energy \(0.1 - 100 eV\) Cation Damage to DNA](#)

L. Sellami, F. Martin, D. Hunting, S. Lacombe, M. A. Huels (Dept. of Nuclear Medicine and Radiobiology, University of Sherbrooke, QC, Canada)

[R1.073 The Electrophoretic Mobility of Proteins near Surfaces](#)

Perumal Ramasamy (DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING, SUNY STONY BROOK UNIVERSITY, NY 11790), Avtar Singh (Stuyvesant High School), Miriam Rafailovich,

JONATHAN SOKOLOV (GARCIA CENTER FOR POLYMERS AT ENGINEERED SURFACES, DEPT OF MATERIALS SCIENCE AND ENGINEERING, SUNY STONYBROOK UNIVERSITY, NY 11790)

[R1.074 Determination of Fe-CO bond energy in Myoglobin by transient grating spectroscopy](#)

Raicu V. (Departments of Chemistry and Physics, University of Toronto, Canada), Walther M. (Physikalisches Institut, Albert-Ludwigs Universitat Freiburg, Germany), Ogilvie J. P., Phillips R., Miller R.J.D. (Departments of Chemistry and Physics, University of Toronto, Canada)

[R1.075 Reversible Folding of Lysozyme by a Quasi-static Process: A First-Order-Like State Transition](#)

Yeh Xu-Cheng, Lin Po-Yen, Chang Chia-Ching (Department of Physics, National Dong Hwa University, Hualien, Taiwan), Kan Lou-Sing (Institute of Chemistry, Academia Sinica, Nankang, Taipei, Taiwan)

[R1.076 Motif analysis and correlation functions of amino acids in nonredundant protein sequences.](#)

Mihaela Sardi, Yi-Kuo Yu (Physics Department, Florida Atlantic University and NCBI, NIH)

[R1.077 Self-assembly and dissociation of collagen monomer: Temperature and ion effects](#)

Alex Dickson, Lancia Guo, Darren Anderson, Darcy Gentleman, Cynthia Goh (University of Toronto)

[R1.078 Low Energy Electron Interactions with Uracil: the Energetics predicted by theory](#)

Xifeng Li, Léon Sanche (Université de Sherbrooke), Michael Sevilla (Oakland University), PES Collaboration

[R1.079 Diffusion, Dispersion, and Mobility of Single-stranded DNA in Polyacrylamide Gel Electrophoresis](#)

Roger Lo, Victor Ugaz (Texas Aamp;M University)

[R1.080 NEAR ZERO eV SUBEXCITATION ENERGY ELECTRONS BREAK DNA](#)

Frederic Martin, Zhongli Cai, Pierre Cloutier, Darel Hunting, Leon Sanche (Research Group in the Radiation Sciences, Faculty of medicine, University of Sherbrooke, Sherbrooke (QC), Canada, J1H 5N4)

[R1.081 Surface Electrophoresis on Flat and Patterned Conducting Surfaces](#)

Eli Hoory (SUNY Stony Brook), Saumya Sharma (Ward Melville High School), Stanley Chiang (Great Neck High School), John Jerome, Vladimir Samuliov, Jonathan Sokolov, Miriam Rafailovich (SUNY Stony Brook)

[R1.082 Vibrational and electronic excitations of H₂O on a thin film of thymine by electron impact and comparison with H₂O on Ar](#)

Wonseok Cho, Marc Michaud, Léon Sanche (Département de Médecine Nucléaire et Radiobiologie, Faculté de Médecine, Université de Sherbrooke, Sherbrooke Québec, Canada J1H 5N4)

[R1.083 DNA Adsorption Kinetics in Evaporating Droplets](#)

Xiaohua Fang, Bingquan Li (SUNY@stony brook), Yong Chen, Chwen-Yang Shew (CUNY@Staten Island), V.A Samuilov (SUNY@stony brook), Y.-S. Seo (National Institute of Standards and Technology), Joseph Baron (Case Western Reserve University), J. Sokolov, M. Rafailovich (SUNY@stony brook)

[R1.084 Infrared Absorption Study of Cytidine and Deoxycytidine at High Pressures](#)

Ian Lawson, Scott Lee (Univ. of Toledo), A. Anderson, L. Lettress (Univ. of Waterloo)

[R1.085 Anomalous Swelling in Wet-Spin Films of Divalent Calf-Thymus DNA](#)

R.L. Marlowe (Un. of Tennessee at Chattanooga), S.A. Lee (Un. of Toledo), A. Rupprecht (Un. of Stockholm)

[R1.086 Low-frequency Raman Difference Spectroscopy of A- and B-DNA in Wet-Spin Films](#)

Scott Lee (Un. of Toledo), A. Rupprecht (Un. of Stockholm)

[R1.087 Morse Parameters of the Intramolecular NH₂ Bond in Adenine and Cytosine](#)

Megan Schwenker, Scott Lee (Un. of Toledo)

R1.088 [Low-frequency Raman spectroscopy of netropsin in solution](#)

A. Anderson (Un. of Waterloo), S.A. Lee (Un. of Toledo)

R1.089 [Strand breaks of dry DNA deposited on tantalum induced by ultrasoft X-rays \(1.5 keV\): contribution from photons and secondary electrons](#)

Zhongli Cai, Pierre Cloutier, Darel Hunting, Leon Sanche (Research Group in the Radiation Sciences, Faculty of Medicine, Université de Sherbrooke, Quebec, J1H 5N4, Canada)

R1.090 [Multiple light scattering effects and their manifestation in conformational memory effects of membrane-bound photosynthetic Reaction Centers](#)

Anthony J. Manzo, Alexander O. Goushcha, Gary W. Scott (Chemistry Department, University of California, Riverside)

R1.091 [Energy Transfer during Induced Transitions: A Double-Well Chain Model](#)

Caroline Ritz-Gold (Center for Biomolecular Studies)

R1.092 [Functional Micro-Domains of Glycolipids with Partially Fluorinated Membrane Anchors Impact on Cell Adhesion](#)

Doris Heinrich, Matthias Schneider, Laurent Limozin, Motomu Tanaka (Phys. Dept., Tech. Univ. Muenchen, 85748 Garching, Germany)

R1.093 [Phase-Specific Diffusivity of DPPG Monolayers](#)

Joel DeWitt, Prem Thapa, Bret Flanders (Oklahoma State University)

R1.094 [Interfacial Properties of Antimicrobial Compounds and Their Interactions With Phospholipid Monolayers and Membranes](#)

Ana Claudia Costa, Dahui Liu, Sungwook Choi, William DeGrado (Department of Biochemistry and Biophysics, University of Pennsylvania)

R1.095 [Production of Cubic Phases in Phospholipid and PEG-Lipid Mixtures](#)

David Wolfe (Lycoming College), Beth Cunningham (Bucknell University), Patrick Williams (King's College London)

R1.096 [Dynamic Light Scattering Microscope](#)

Jonathan Celli, Brian Gregor (Department of Physics, Boston University)

R1.097 [Experimental Study of the Dynamics of Ant Search Paths](#)

D. J. Slomski, S. M. Covert, G. W. Baxter (Physics Department, Penn State Erie, The Behrend College)

R1.098 [Analysis of PCR Thermocycling by Rayleigh-Bénard Convection](#)

Ruchi Sharma, Victor Ugaz (Texas Aamp;M University)

R1.099 [Pumping and Thermocycling in Closed-loop Convective Flow Systems](#)

Nitin Agrawal, Victor Ugaz (Texas Aamp;M University)

R1.100 [Effect of Planning on Trunk Motion and Knee Moments During a Side Step Cut Task](#)

Jeff Houck (Ithaca College), Stacey Gorniak (PSU-Erie), Kristen Nicholson (Ithaca College)

R1.101 [Demonstration of very-low-magnetic-field MRI of human lungs](#)

R. Mair, M. Rosen, L. Tsai, J. Ng, R. Walsworth (Harvard-Smithsonian), M. Hrovat, S. Patz, G. Topulos (Brigham and Women's Hospital), F. Hersman, I. Ruset (U. New Hampshire)

R1.102 [Analysis of Myoglobin Adsorption to Cu\(II\)-IDA and Ni\(II\)-IDA Functionalized Langmuir Monolayers by Grazing Incidence Neutron and X-ray Techniques](#)

Michael Kent, Hyun Yim, Darryl Sasaki (Sandia National Laboratories), Sushil Satija (National Institutes of Standards and Technology), Jaroslaw Majewski (Los Alamos National Laboratory), Thomas Gog (Argonne National Laboratories)

R1.103 [BRUSH TRANSITION OF SULFONATED IONOMER MONOLAYERS AT THE AIR/WATER INTERFACE](#)

Farhan Ahmad, Kwanwoo Shin (Department of Materials Science and Engineering, Kwangju Institute of Science and Technology, Gwangju, 500-712, Korea), Sushil Satija (National Institute of Science and Technology), Miriam Rafailovich, John Sokolov (Stony Brook University), Jung Soo Lee, Chang-Hee Lee (Korea Atomic Energy Research Institute)

[R1.104 A simulation model of biofilms with autonomous cells: analysis of a two-dimensional version](#)
Yergou Tatek, Gary Slater (University of Ottawa)

[R1.105 Deciphering Biochemical Network: from particles to planes then to spaces](#)

Xinhao Ye, Siliang Zhang (Department of Biochemical Engineering, East China Univ. of Sci. and Tech., Shanghai, China), National Engineer Research Center for Biotechnology(Shanghai) Team

[R1.106 Base-flipping simulated with an implicit solvent model](#)

Jason Grigsby, Jr. Salisbury (Wake Forest University)

[R1.107 A theoretical study of a blue fluorescent antibody and trans-stilbene](#)

Jr. Salisbury (Wake Forest University), Wen-Ge Han, Louis Noodleman, III Brooks (The Scripps Research Institute)

[R1.108 Network Rigidity Calculations of Cold Denaturation](#)

Gregory Wood, Donald Jacobs (Physics and Astronomy Department, California State University, Northridge CA 91330)

[R1.109 Shannon Information in Complete Genomes](#)

Li-Ching Hsieh, Chang-Heng Chang (Department of Physics, National Central University, Chungli, Taiwan 320), Hoong-Chien Lee (Department of Physics and Department of Life Science, National Central University, Chungli, Taiwan 320)

[R1.110 Direct reduction of hydrogen peroxides into hydroxyl ions in peroxide-based fuel cell](#)

Nie Luo, George H. Miley (Dept. of Nuclear, Plasma and Radiological Engineering, University of Illinois, Urbana, Il, 61821 USA), D.W. Noid (Oak Ridge National Laboratory)

[R1.111 Modeling the static and dynamic elastic properties of microtubules](#)

Stephanie Portet (SLRI, Mount Sinai Hospital, University of Toronto, Canada), Jack Tuszynski (Department of Physics, University of Alberta, Canada), John Dixon (Department of Physics, University of Warwick, UK)

[R1.112 Anomalous diffusion in living yeast cells](#)

Iva Marija Tolic-Nørrelykke, Emilia-Laura Munteanu (Niels Bohr Institute, University of Copenhagen), Genevieve Thon (Institute of Molecular Cell Biology, University of Copenhagen), Lene Oddershede, Kirstine Berg-Sørensen (Niels Bohr Institute, University of Copenhagen)

[R1.113 Effect of Polybutadiene on Human Dermal Fibroblasts proliferation](#)

Kelly Gloor (Dartmouth University), Tedi Setton (Wellsley University), Joshua Levine (Columbia University), Shouren Ge, E Guan, Lourdes Collazo, Miriam Rafailovich (Stony Brook University)

[R1.114 Effect of three distinct recombinant cell-binding domains of FN \(rCDFN\) and substrate crosslinking density on the morphology and dynamics of Human Dermal Fibroblast cells](#)

K Ghosh (SUNY, Stony Brook), XZ Shu (Univ. of Utah), S Ge, X Fang, M Rafailovich (SUNY, Stony Brook), GD Prestwich (Univ. of Utah), RAF Clark (SUNY, Stony Brook)

Session S1. DCMP/DBP/DCOMP: DCMP/DBP/DCOMP Prize Session. Wednesday afternoon, 14:30, 517A, Palais des Congres

14:30 [S1.001 Liquid Crystals and the World of Broken Symmetry](#)

Tom Lubensky (University of Pennsylvania)

15:06 [S1.002 Spherical Crystallography: Virus Buckling and Grain Boundary Scars](#)

David Nelson (*Lyman Laboratory of Physics and DEAS, Harvard University, Cambridge, MA 02138*)

15:42 [S1.003 Conformal Symmetry - a Cornucopia of Analytic Results in Two-Dimensional Physics](#)

John Cardy (*Oxford University*)

16:18 [S1.004 2004 Rahman Prize in Computational Physics: HOW DO SOLIDS FAIL? A Research Adventure Using Lots Of Atoms And Big Computers](#)

Farid Abraham (*IBM Research Division, Almaden Research Center, San Jose CA 95120*)

16:54 [S1.005 Energy Landscapes and Solved Protein Folding Problems](#)

Peter Wolynes (*University of California, San Diego*)

Session S7. DBP: Molecular Motors and the Physics of Cell Division.

Wednesday afternoon, 14:30, 516C, Palais des Congres

14:30 [S7.001 Mitosis: History and Overview.](#)

Jonathan Scholey (*Center for Genetics and Development and Section of MCB, University of California, Davis, CA 95616.*)

15:06 [S7.002 Reeling in chromosomes to spindle poles: The roles of microtubule-destabilizing enzymes in mitotic spindle dynamics](#)

David Sharp (*Albert Einstein College of Medicine*)

15:42 [S7.003 Regulatory mechanisms controlling mitotic spindle assembly](#)

Andrew Wilde (*Department of Medical Genetics and Microbiology. University of Toronto*)

16:18 [S7.004 Molecular motors and physics of cell division](#)

Jorge V. Jose (*Center for the Interdisciplinary Research on Complex Systems and Physics Department, Northeastern University, Boston, MA 02115*)

Session S8. DBP: Nucleic Acids II.

Wednesday afternoon, 14:30, 510A, Palais des Congres

14:30 [S8.001 Computing Optimal Binding of Two Nucleic Acid Chains](#)

Nathan O. Hodas, Daniel P. Aalberts (*Williams College*)

14:42 [S8.002 Thermodynamic Modeling of Donor Splice Site Recognition in pre-mRNA](#)

Daniel P. Aalberts, Jeffrey A. Garland (*Williams College*)

14:54 [S8.003 Isomers of the DNA bases and their possible role in base pair mismatch](#)

Karo Michaelian (*Instituto de Fisica, Universidad Nacional Autonoma de Mexico, A.P. 20-364, 01000 Mexico D.F. Mexico*), Aldo Romero (*Instituto Potosino de Investigacion en Ciencias y Tecnologia, C.P 78216, San Luis Potosi, Mexico*)

15:06 [S8.004 Statistical mechanics of base stacking and pairing in DNA melting](#)

Vassili Ivanov, Yan Zeng, Giovanni Zocchi (*Department of Physics and Astronomy, University of California Los Angeles*)

15:18 [S8.005 Molecular dynamics simulations of the d\(CCAACGTTGG\)₂ decamer in crystal environment: comparison of atom-centered charge, extra-point and polarizable force fields.](#)

Jason Baucom (*North Carolina State University (NCSU)*), Thomas Transue (*National Institute of Environmental Health Sciences (NIEHS)*), Miguel Fuentes-Cabrera (*NCSU*), Joseph Krahn, Thomas Darden (*NIEHS*), Celeste Sagui (*NCSU*)

15:30 [S8.006 Excluded volume effects in unzipping DNA with a force](#)

Pui-Man Lam (*Department of Physics, Southern University, Baton Rouge*)

15:42 [S8.007 Diffusion-limited looping of biopolymers: theory and biological implications](#)

Suckjoon Jun, John Bechhoefer (Physics, Simon Fraser Univ., Vancouver), Bae-Yeun Ha (Physics, University of Waterloo, Waterloo, Canada)

15:54 [S8.008 A Gibbs sampler for motif detection in phylogenetically close sequences](#)

Rahul Siddharthan (The Rockefeller University), Erik van Nimwegen (University of Basel), Eric Siggia (The Rockefeller University)

16:06 [S8.009 Bioinformatics in the Thermodynamic Limit: Applications to pre-mRNA Splice Site Detection](#)

Eric G. Daub, Daniel P. Aalberts (Williams College)

16:18 [S8.010 Differences in Muon and Muonium Trapping in A- and B-form DNA and in Individual Nucleic Acids: an initial study](#)

E. Torikai (Yamanashi University, Kofu, Japan; RIKEN, Wako-shi, Japan), R. H. Scheicher, T. P. Das (State University of New York at Albany, Albany NY), F. L. Pratt (ISIS Facility, Rutherford Appleton Laboratory, Chilton, Didcot, UK), K. Nagamine (KEK-MSL, Tsukuba, Japan)

16:30 [S8.011 Fabrication of Electrically Addressable Nanopore Arrays for DNA Translocation Studies](#)

Sang Ryoul Park, X. S. Ling (Department of Physics, Brown University)

16:42 [S8.012 Self Assembly of Nanotubes from DNA Tiles](#)

Axel Ekani-Nkodo, Ashish Kumar, Deborah Kuchnir Fygenson (Physics Department, Biomolecular Science and Engineering Program and California NanoSystems Institute, UC Santa Barbara, CA 93106)

16:54 [S8.013 Reversible aggregation and Phase Transition in the DNA-linked gold nanoparticle Systems](#)

Young Sun, Nolan Harris, Ching-Hwa Kiang (Department of Physics and Astronomy, Rice University, Houston, TX 77005)

17:06 [S8.014 Phase Transition of DNA Coated Nanogold Networks](#)

Ching-Hwa Kiang, Young Sun, Nolan Harris, Nissanka Wickremasinghe (Department of Physics and Astronomy, Rice University, Houston, TX 77005)

17:18 [S8.015 HMGB1 proteins strongly alter the flexibility of single DNA molecules](#)

Micah McCauley (Department of Physics, Northeastern University), Philip R. Hardwidge, L. James Maher (Department of Biochemistry and Molecular Biology, Mayo Foundation), Mark C. Williams (Department of Physics, Northeastern University)

[S8.016 Effects of kinks on DNA elasticity.](#)

Yuri Popov, Alexei Tkachenko (University of Michigan)

Session S9. DBP: Focus Session: Stretching of Proteins.

Wednesday afternoon, 14:30, 510B, Palais des Congres

14:30 [S9.001 Mechanical stretching and contact order of proteins](#)

Marek Cieplak (Institute of Physics, Polish Academy of Sciences, 02-668 Warsaw, Poland)

15:06 [S9.002 Probing the energy landscape of proteins using mechanical unfolding experiments](#)

Dave Thirumalai (University of Maryland)

15:42 [S9.003 Experiments & Simulations of Pathway Shifts & T-dependent Forced Unfolding of 3-helix Proteins](#)

Dennis Discher, Richard Law, Mike Klein (Univ. Pennsylvania)

15:54 [S9.004 Mechanical Properties of Single Collagen Fibrils Revealed by Force Spectroscopy](#)

John Graham (Department of Physics and Astronomy, University of Missouri-Columbia, Columbia, MO, USA), Charlotte Phillips (Department of Biochemistry, University of Missouri-Columbia, Columbia, MO, USA), Michel Grandbois (Département de Pharmacologie, Université de Sherbrooke, Sherbrooke, PQ, Canada)

- 16:06 [S9.005 Density functional theory study of alpha-helical polypeptides under tensile strain.](#)
Joel Ireta (*Fritz-Haber-Institut, Berlin, Germany*), Joerg Neugebauer (*Theoretische Physik, Universitaet Paderborn, Germany*), Matthias Scheffler (*Fritz-Haber-Institut, Germany*)
- 16:18 [S9.006 The effect of pulling geometry and concatamer architecture on the mechanical unfolding force of \$\beta\$ -sheet proteins](#)
PD Olmsted, RC Zinober, DA Smith (*School of Physics and Astronomy, University of Leeds*), AW Blake, DJ Brockwell, SE Radford (*School of Biochemistry and Molecular Biology, University of Leeds*), GS Beddard (*School of Chemistry, University of Leeds*), RN Perham (*Department of Biochemistry, University of Cambridge*), E Paci (*Biochemisches Institut der Universität Zürich*)
- 16:30 [S9.007 Nonlinear Elasticity of \$\alpha\$ -helical domains](#)
Buddhapriya Chakrabarti, Alex Levine (*University of Massachusetts, Amherst*)
- 16:42 [S9.008 Flexibility of Protein Secondary Structures](#)
Eldon Emberly (*Physics Department, Simon Fraser University, Burnaby BC, CANADA*), Ranjan Mukhopadhyay, Chao Tang, Ned Wingreen (*NEC Laboratories America, Princeton, New Jersey 08540*)
- 16:54 [S9.009 Artificial Allosteric Control of Maltose Binding Protein](#)
Brian Choi, Giovanni Zocchi (*Department of Physics and Astronomy, University of California, Los Angeles*), Stephan Canale (*Department of Molecular, Cell and Developmental Biology*), Yim Wu, Sum Chan, Jeanne Perry (*UCLA-DOE Institute for Proteomics and Genomics*), *UCLA-DOE Institute for Proteomics and Genomics Collaboration, Department of Molecular Collaboration*

WEDNESDAY AFTERNOON, 24 MARCH 2004, 17:30

Session t8. DBP/DCMP: Mechanics of Biological Cells and Cytoskeleton Protein Networks.

Wednesday afternoon, 17:30, 510A, Palais des Congres

- 17:30 [t8.001 Affine vs. nonaffine deformation in cytoskeletal networks](#)
Alex Levine (*University of Massachusetts, Amherst*)
- 18:06 [t8.002 Elasticity of Composite Actin Networks](#)
Margaret Gardel (*Harvard University*)
- 18:42 [t8.003 Biomechanics and Intracellular Dynamics of Vascular Endothelial Cells](#)
H. Daniel Ou-Yang (*Physics Department, Lehigh University, Bethlehem, PA 18015*)
- 19:18 [t8.004 Skin Layer at the Actin-Gel Surface: Quenched Protein Membranes with Flat, Crumpled and Tubular Morphologies](#)
L.S. Hirst (*Materials and Physics Departments, Biomolecular Science and Engineering Program, University of California, Santa Barbara, 93106.*)
- 19:54 [t8.005 Micromechanics of the Cytoskeleton Controlled by Cross-link Self-Assembly](#)
John C. Crocker (*U.Penn*)

Session t9. DBP: Interacting Biological Agents in Experiment and Theory.

Wednesday afternoon, 17:30, 510B, Palais des Congres

- 17:30 [t9.001 Self-organized Motion During Dictyostelium amoebae aggregation](#)
Herbert Levine (*Univ. of California, San Diego*)

18:06 [t9.002 Collective motion in animal groups](#)

Iain Couzin (University of Oxford and Princeton University)

18:42 [t9.003 Birds, Fish, and Sludge: New Theories of Old Problems in Collective Motion](#)

John Toner (Department of Physics and Institute for Theoretical Science, University of Oregon)

19:18 [t9.004 Swarming Patterns in a Two-Dimensional Kinematic Model for Biological Groups](#)

Chad Topaz (Department of Mathematics, UCLA)

19:54 [t9.005 The theory of swarming of Active Brownian Particles](#)

Udo Erdmann (Institute of Physics, Humboldt-University Berlin, Newtonstr. 15, 12489 Berlin, Germany)

THURSDAY MORNING, 25 MARCH 2004, 08:00

Session U7. DBP: Physics and Biology of Protein-DNA Interactions. Thursday morning, 08:00, 516C, Palais des Congres

08:00 [U7.001 Understanding the mechanisms of protein-DNA interactions](#)

Richard Lavery (Laboratoire de Biochimie Theorique, IBPC, Paris, France)

08:36 [U7.002 Specificity of protein-DNA interaction in transcription control: physics, evolution and bioinformatics](#)

Anirvan Sengupta (Department of Physics and Astronomy and the BioMaPS Institute, Rutgers University, Piscataway, NJ)

09:12 [U7.003 Is There a Code for Protein-DNA Recognition?](#)

Gary D. Stormo (Washington University in St. Louis)

09:48 [U7.004 Computational studies of small RNA regulation](#)

Rahul Kulkarni (NEC Laboratories America)

Session U8. DBP: Biomedical Physics I: Skin, bone, heart. Thursday morning, 08:00, 510A, Palais des Congres

08:00 [U8.001 Investigation of Skin Cancers Using MicroRaman Spectroscopy](#)

M. A. Short, X. K. Chen (Department of Physics, Simon Fraser University; Burnaby, British Columbia, V5A 1S6, Canada), H. Zeng (Department of Cancer Imaging, British Columbia Cancer Agency; Vancouver, BC, V5Z 1L3, Canada), A. A. Ajlan, D. I. McLean, H. Hui (Division of Dermatology, University of British Columbia, Vancouver, BC, V5Z 4E8, Canada), X. K. Chen Team, H. Zeng Collaboration, H. Lui Collaboration

08:12 [U8.002 Keratin based materials: a deep-UV inelastic light-scattering study](#)

Benjamin Schulz, Danny Chan, Joakim Bäckström, Michael Rübhausen (Institut für Angewandte Physik, Universität Hamburg, Jungiusstraße 11, D-20355 Hamburg, Germany)

08:24 [U8.003 In-vivo spectroscopic ellipsometry measurements of human skin](#)

Danny Chan, Benjamin Schulz, Michael Rübhausen (Institute of Applied Physics, University of Hamburg, Jungiusstr. 11, 20355 Hamburg, Germany)

08:36 [U8.004 Physical Properties of the Transcytosis Machinery in Endothelial Cells](#)

Meron Mengistu, Linda Lowe-Krentz (Department of Biological Science, Lehigh University), H. Daniel Ou-Yang (Department of Physics, Lehigh University)

08:48 [U8.005 Diffraction enhanced computed tomography of trabecular bone](#)

Dean Connor, Dale Sayers (North Carolina State University), David Lalush Collaboration, D. Rick Sumner Collaboration, Zhong Zhong Collaboration

09:00 [U8.006 Trabecular bone as a hierarchical material](#)

Iwona Jasiuk (Georgia Institute of Technology)

09:12 [U8.007 Alternans Suppression in Cardiac Tissue by Electrotonic Effects](#)

Flavio Fenton (Beth Israel Medical Center), Elizabeth Cherry (Hofstra University)

09:24 [U8.008 Short-term Cardiac Memory Can Suppress Alternans](#)

Elizabeth Cherry (Hofstra University), Flavio Fenton (Beth Israel Medical Center)

09:36 [U8.009 Hierarchical Structure of Heart Rate Variability in Humans](#)

X.Z. Gao (Department of Mech. amp; Ind. Engng., Ryerson University, Toronto, Canada), E.S.C Ching (Department of Physics, The Chinese University of Hong Kong), D.C. Lin (Department of Mech. amp; Ind. Engng., Ryerson University, Toronto, Canada)

09:48 [U8.010 Synchronization and Cardio-pulmonary feedback in Sleep Apnea](#)

Limei Xu, Plamen Ch. Ivanov, Zhi Chen, Kun Hu (Boston University), David Paydarfar (University of Massachusetts), H. Eugene Stanley (Boston University)

10:00 [U8.011 STUDY OF SEDIMENTATION OF BLOOD USING LIGHT TRASMISION](#)

CESAR CAB-CAUICH (CINVESTAV-UNIDAD MERIDA, MERIDA, 97310, MEXICO), OLGA LEANOS (UNIVERSITY OF GUELPH, GUELPH, ONTARIO, N1G2W1, CANADA), JUAN ALVARADO-GIL, GERARDO GOLD (CINVESTAV-UNIDAD MERIDA, MERIDA, 97310, MEXICO)

10:12 [U8.012 Low-Energy Defibrillation Failure Correction is Possible Through Nonlinear Analysis of Spatiotemporal Arrhythmia Data](#)

Jennifer Simonotto, Michael Furman (Biomedical Engineering Department, University of Florida), Thomas Beaver (Division of Thoracic and Cardiovascular Surgery, University of Florida), Mark Spano (US Navy, Carderock Laboratory), Katherine Kavanagh, Jason Iden, Gang Hu (Department of Medicine, University of Alberta), William Ditto (Biomedical Engineering Department, University of Florida)

10:24 [U8.013 Nested Sphere Model for SQUID-based Impedance Magnetocardiography](#)

Vijayanand Vajrала, Dharmakeerthi Nawarathna, James Claycomb, John Miller (University of Houston, Houston, TX USA)

10:36 [U8.014 Targeted medication delivery using magnetic nanostructures](#)

Mina Yoon, David Tomanek (Michigan State University)

10:48 [U8.015 ECM Proteins Glycosylation and Relation to Diabetes](#)

Nadine Pernodet, Ayla Bloomberg, Vandana Sood, Lenny Slutsky, Shouren Ge, Richard Clark, Miriam Rafailovich (Materials Science, SUNY at Stony Brook, NY)

Session U9. DBP: Focus Session: Structure and Dynamics of Proteins. Thursday morning, 08:00, 510B, Palais des Congres

08:00 [U9.001 Ab Initio Electronic Structure of Antiferromagnetic Metal Centers in Proteins](#)

Jorge H. Rodriguez (Department of Physics, Purdue University, West Lafayette, IN 47907)

08:36 [U9.002 Ab Initio Excited State Dynamics of the Green Fluorescent and Photoactive Yellow Protein Chromophores](#)

Todd Martinez (University of Illinois at Urbana-Champaign)

09:12 [U9.003 Conformational Control of Electron Tunneling in Redox Proteins: Sulfite Oxidase](#)

Ilya Balabin, Tsutomu Kawatsu (Duke University), David Beratan (Duke University)

09:24 [U9.004 Diffusion coupled intramolecular electron transfer in proteins](#)
Tsutomu Kawatsu, David Beratan (Department of Chemistry, Duke University)

09:36 [U9.005 Ab initio Study of Transition metal binding to the Prion Protein](#)
Daniel L. Cox, Rajiv R.P. Singh, Jianping Pan (Physics Department, University of California, Davis)

09:48 [U9.006 First Principles Hartree Fock Investigation of Electronic Structure and Hyperfine Properties of Nitrosylhemoglobin](#)
Minakhi Pujari, T. P. Das (Dept. of Physics, SUNY, Albany, NY), N. Sahoo (Dept. of Radiation Oncology, Albany Medical Center, Albany, NY)

10:00 [U9.007 ATP-Binding Cassette Proteins: Towards a Computational View of Mechanism](#)
Jielou Liao (APS), David N. Beratan Collaboration

10:12 [U9.008 Mechanistic Investigation of Enzymes using QM/MM Methods](#)
Yolanda Small (Penn State University), Sharon Hammes-Schiffer Collaboration

10:24 [U9.009 Quantum studies of deprotonated forms of malonic acid](#)
Eliana Ascitutto, Jung Goo Lee (North Carolina State University), Lee G Pedersen (University of North Carolina at Chapel Hill), Celeste Sagui (North Carolina State University)

10:36 [U9.010 Electronic structure of metallic reaction centers in biomolecules](#)
Michal Bajdich, Lucas K. Wagner, Gabriel Drobny (North Carolina State University), Jeffrey C. Grossman (Lawrence Livermore National Laboratory), Lubos Mitas (North Carolina State University)

10:48 [U9.011 Reflectance anisotropy for porphyrin oxaester](#)
Raúl Vázquez-Nava, César Castillo, Bernardo Mendoza (Centro de investigaciones en óptica A. C. Loma del Bosque No. 115, Col. Lomas del Campestre, León, Guanajuato, México.)

THURSDAY MIDDAY, 25 MARCH 2004, 11:15

Session V8. DBP: Focus Session: Synchronization and Phase Resetting in the Nervous System.

Thursday midda, 11:15, 510A, Palais des Congres

11:15 [V8.001 Stochastic synchronization and phase resetting in electroreceptors of paddlefish](#)
Alexander Neiman (Department of Physics and Astronomy, Ohio University, Athens, OH 45701)

11:51 [V8.002 Tomographic synchronization and phase resetting analysis of the human brain with magnetoencephalography](#)
Peter Tass (Institute of Medicine, Research Center Juelich, 52425 Juelich, Germany)

12:27 [V8.003 Discontinuities, Canards, and Invariant Manifolds in the Phase-Resetting Response of Cardiac Pacemakers](#)
Trine Krogh-Madsen, Leon Glass (Dept. Physiology, McGill University), Eusebius Doedel (Dept. Computer Science, Concordia University), Michael R. Guevara (Dept. Physiology, McGill University)

12:39 [V8.004 Receptors as a master key for synchronization of rhythms](#)
Seido Nagano (Bioscience and Bioinformatics, Ritsumeikan University)

12:51 [V8.005 Properties of Phase Synchronization as a Mechanism for Parameter Adaptive Control](#)
Michal Zochowski, Rhonda Dzakpasu (University of Michigan Department of Physics and Biophysics Research Division)

13:03 [V8.006 Controlling synchrony in ensemble of globally coupled neuronal oscillators](#)
Arkady Pikovsky, Michael Rosenblum (Department of Physics, University of Potsdam, Potsdam, Germany)

13:15 [V8.007 Reliability, spike timing precision, and phase synchronization in model neurons of cat retinal ganglion cells](#)

Muhammad Afghan, Peter Jung (Department of Physics And Astronomy, Ohio University, Athens OH 45701), Michael Rowe (Department of Biological Sciences, Ohio University, Athens OH 45701), Alexander Neiman (Department of Physics And Astronomy, Ohio University, Athens OH 45701)

13:27 [V8.008 Phase Tracking of Moving Epileptic Foci Using EEG and Phase-Dynamic Quantification Analysis](#)

Michael Furman (Biomedical Engineering Department, University of Florida), J. Chris Sackellares (Department of Neurology, University of Florida), Paul Carney (Department of Pediatrics and Neurology, University of Florida), Abraham Miliotis, Jennifer Simonotto, William Ditto (Biomedical Engineering Department, University of Florida)

13:39 [V8.009 Long Chaotic Transients and Robust Synchronization in Complex Neural Networks](#)

Alexander Zumdieck, Marc Timme, Theo Geisel, Fred Wolf (Max-Planck-Institut für Strömungsforschung, 37073 Göttingen, Germany)

13:51 [V8.010 Clustering through Postinhibitory Rebound in Coupled Neurons](#)

David Tai Wai Chik (Department of Physics, The University of Hong Kong, Hong Kong, China.), Steve Coombes (School of Mathematical Sciences, University of Nottingham, UK.), ZiDan Wang (Department of Physics, The University of Hong Kong, Hong Kong, China.)

14:03 [V8.011 Correlation-induced network oscillations of pyramidal cells in the weakly electric fish - theory and experiment](#)

Benjamin Lindner, Brent Doiron, Andre Longtin, Leonard Maler (University of Ottawa), Joseph Bastian (University of Oklahoma)

[V8.012 Synchronization of firing patterns in neuronal cultures](#)

Luis Bettencourt (CCS-3 Computer and Computational Science, Los Alamos National Laboratory), Greg Stephens (P21 Computational Neuroscience, Los Alamos National Laboratory), Gross Guenter (Center for Network Neuroscience, Department of Biological Sciences, University of North Texas, Denton)

Session V9. DBP: Biomolecular Computation.

Thursday midday, 11:15, 510B, Palais des Congres

11:15 [V9.001 Topology and reaction coordinates in protein folding kinetics](#)

Steven Plotkin, Reza Ejtahadi (University of British Columbia)

11:27 [V9.002 Diffusion in a Rough Energy Landscape: A re-examination](#)

Ulrich Zurcher (Physics Dept, Cleveland State University, Cleveland OH 44115)

11:39 [V9.003 Efficient use of non-equilibrium measurements to approximate free energy differences](#)

F. Marty Ytreberg, Daniel M. Zuckerman (Center for Computational Biology, University of Pittsburgh)

11:51 [V9.004 A General Approach for Calculating the Optical Properties of Bacteriochlorophyll Aggregates](#)

Janosi Lorant, Ioan Kosztin (Department of Physics and Astronomy, University of Missouri - Columbia)

12:03 [V9.005 Exploring the assembly mechanism of tetrapeptide oligomers using the Activation-Relaxation Technique](#)

Guanghong Wei, Normand Mousseau (Département de physique and RQMP, Université de Montréal), Philippe Derreumaux (Laboratoire de Biochimie Théorique, UPR 9080 CNRS, Institut de Biologie Physico-Chimique)

12:15 [V9.006 Finite size scaling of structural transitions in a simulated protein with secondary and tertiary structure](#)

Prem Chapagain, Bernard Gerstman (Department of Physics, Florida International University), Theoretical Biophysics Team

12:27 [V9.007 Entropically Driven Helix Formation](#)

Yehuda Snir, Randall Kamien (Department of Physics and Astronomy, University of Pennsylvania)

12:39 [V9.008 MAME: Minimal Atomic Multipole Expansion of Molecular Fields](#)

Eugene V. Tsiper (Naval Research Laboratory and George Mason University), Kieron Burke (Rutgers University)

12:51 [V9.009 Quantum Monte Carlo study of hydrogen bonded model systems - benchmarking density functionals](#)

M. Fuchs, J. Ireta, M. Scheffler (Fritz-Haber-Institut der MPG, Berlin), C. Filippi (Instituut Lorentz, Leiden Univ.)

13:03 [V9.010 Electrostatic interactions in molecular materials](#)

Anna Painelli, Francesca Terenziani (Universita' di Parma)

13:15 [V9.011 Modeling of Novel Analyte Detection by Protein Pores and Nanotubes](#)

Chung Yin Kong, M. Muthukumar (University of Massachusetts)

13:27 [V9.012 Origin of Icosahedral Symmetry in Viruses](#)

Roya Zandi, David Reguera (Department of Chemistry and Biochemistry, UCLA), Robijn Bruinsma (Department of Physics and Astronomy, UCLA), William Gelbart (Department of Chemistry and Biochemistry, UCLA), Joseph Rudnick (Department of Physics and Astronomy, UCLA)

13:39 [V9.013 Study of Electronic Structure and Geometry of Gd³⁺ liganded with H₂O molecules in Aqueous solution using First Principles Hartree-Fock Cluster Procedure](#)

C. Gaire, K.R. Lata, R. H. Scheicher, Jeong Junho, T. P. Das (Dept of Physics, SUNY at Albany, NY), S. P. Byahut, D.D. Paudyal, M.M. Aryal, D. R. Mishra (Central Dept of Physics, Tribhuvan University, Kirtipur, Nepal)

[V9.014 Molecular Dynamics based on a Generalized Born solvation model: application to protein folding](#)

Alexey Onufriev (Virginia Tech)

Session V10. DBP: Focus Session: Physics in Physiology I.

Thursday midday, 11:15, 510C, Palais des Congres

11:15 [V10.001 Dressed Neurons: Modeling the Tripartite Synapse](#)

Peter Jung (Department of Physics and Astronomy and Quantitative Biology Institute, Ohio University)

11:51 [V10.002 Spatial Distribution of Ion channels Determines Biologic Function](#)

Shangyou Zeng, Peter Jung (Department of Physics and Astronomy, Ohio University)

12:03 [V10.003 Gating-by-tilt of mechanosensitive membrane channels](#)

pierre Sens (Institut Curie - France), Matthew Turner (Warwick University - UK)

12:15 [V10.004 Modeling rectification in open single-file ion channels](#)

Peter Hugo Nelson (Department of Physics, Benedictine University)

12:27 [V10.005 Structure and Interactions in Neurofilament Networks](#)

Jayna Jones, Miguel Ojeda-Lopez, Cyrus Safinya (Materials and Physics Departments, UCSB)

12:39 [V10.006 Noise Shaping by Interval Correlations Increases Information Transfer](#)

Maurice J. Chacron, Benjamin Lindner, André Longtin (University of Ottawa)

12:51 [V10.007 Effect of noisy stimulation on neurobiological sensitization systems and its role for normal and pathological physiology](#)

Martin Huber (Klinik für Psychiatrie und Psychotherapie, Universität Marburg), Hans Braun (Institut für Normale und Pathophysiologische Physiologie, Universität Marburg), Jürgen-Christian Krieg (Klinik für Psychiatrie und Psychotherapie, Universität Marburg)

13:03 [V10.008 Dynamics of Paroxysmal Tachycardia](#)

Leon Glass (McGill University, Montreal, QC Canada)

13:39 [V10.009 Global organization of dynamics in heterogeneous spontaneously active](#)

Gil Bub, Alvin Shrier, Leon Glass (McGill University)

13:51 [V10.010 Dynamic Approaches for Facial Recognition Using Digital Image Speckle Correlation](#)

Sara Rafailovich-Sokolov (Stella K. Abraham High School, Hewlett, NY 11570), E Guan, Isabelle Afriat, Miriam Rafailovich, Jonathan Sokolov (Dept. of Materials Science, State University of New York, Stony Brook, NY11790), Richard Clark (Dept. of Biomedical Engineering, State University of New York, Stony Brook, NY11790)

14:15 [V10.011 Circadian Role in Daily Pattern of Cardiovascular Risk](#)

Plamen Ch. Ivanov, Kun Hu, Zhi Chen (Boston University), Michael F. Hilton (Division of Sleep Medicine, Harvard Medical School), H. Eugene Stanley (Boston University), Steven A. Shea (Division of Sleep Medicine, Harvard Medical School)

14:15 [V10.011 Circadian Role in Daily Pattern of Cardiovascular Risk](#)

Plamen Ch. Ivanov, Kun Hu, Zhi Chen (Boston University), Michael F. Hilton (Division of Sleep Medicine, Harvard Medical School), H. Eugene Stanley (Boston University), Steven A. Shea (Division of Sleep Medicine, Harvard Medical School)

[V10.012 Dendritic polymer-based nanodevices for targeted drug delivery applications](#)

R. M. Kannan, Parag Kolhe, Sezen Gurdag, Jayant Khandare (Chemical Engineering, Materials Science, Biomedical Engineering, Wayne State University), Mary Lieh-Lai (Children's Hospital of Michigan)

THURSDAY AFTERNOON, 25 MARCH 2004, 14:30

Session W4. DBP/DCMP/GSNP: Structure and Dynamics of Complex Networks.

Thursday afternoon, 14:30, 517C, Palais des Congres

14:30 [W4.001 Community structure in networks](#)

Mark Newman (University of Michigan)

15:06 [W4.002 Fluxes and dynamics in complex networks](#)

Albert-László Barabási (University of Notre Dame, Department of Physics)

15:42 [W4.003 Synchronization on complex networks](#)

Steven Strogatz (Cornell University)

16:18 [W4.004 Boolean Logic Networks as a Paradigm for Developmental Dynamics](#)

Stuart Kauffman (Santa Fe Institute)

Session W7. DBP: The Theory of Hydrogen Transfer Reactions in Biological Systems.

Thursday afternoon, 14:30, 516C, Palais des Congres

14:30 [W7.001 Proton Transfers in Enzyme and Ribozyme Active Sites](#)

James T. Hynes (Dept. de Chimie, Ecole Normale Supérieure, 24, rue Lhomond, 75231 Paris, France)

15:06 [W7.002 Hybrid quantum-classical molecular dynamics of hydrogen transfer reactions in enzymes](#)
Sharon Hammes-Schiffer (Pennsylvania State University)

15:42 [W7.003 Dynamics and Catalysis](#)
Charles L. Brooks III (The Scripps Research Institute)

16:18 [W7.004 Chemical Reaction in an Enzymatic Environment – the Role of Quantum Mechanics](#)
Steven Schwartz (Dept. of Biophysics Albert Einstein College of Medicine)

16:54 [W7.005 Balancing Kinetic and Thermodynamic Control: The Mechanism of Carbocation Cyclization by Squalene Cyclase](#)
Jiali Gao (University of Minnesota)

Session W8. DBP: Focus Session: Structure and Dynamics of DNA. Thursday afternoon, 14:30, 510A, Palais des Congres

14:30 [W8.001 Statics and Dynamics of DNA Molecules Confined in Nanochannels](#)
Walter Reisner (Dept. of Physics, Princeton University), Gianluca Lattanzi (Hahn-Meitner Institute), Jonas Tegenfeldt (Dept. of Physics, Lund University), Robert Riehn, Yan Mei Wang (Dept. of Physics, Princeton University), Erwin Frey (Hahn-Meitner Institute), Robert Austin (Dept. of Physics, Princeton University)

14:42 [W8.002 Restriction mapping of DNA stretched in nanofluidic devices](#)
Robert Riehn, Yan Mei Wang, Robert H. Austin (Department of Physics, Princeton University, 08544 Princeton, NJ), Manchun Lu, Edward C. Cox (Department of Molecular Biology, Princeton University, 08544 Princeton, NJ)

14:54 [W8.003 Spatial imaging of proteins bound to nanochannel-linearized DNA](#)
Yan Mei Wang, Jonas Tegenfeldt, Walter Reisner, Robert Austin (Physics Dept.), Ted Cox (Molecular Biology Dept., Princeton University)

15:06 [W8.004 Structure and Dynamics of Four-way DNA Junctions Dynamics Revealed by Single-Molecule AFM](#)
Yuri Lyubchenko (School of Life Sciences, Arizona State University, Tempe, AZ 85287-4501, USA)

15:42 [W8.005 Observing Holliday junction branch migration one step at a time](#)
Taekjip Ha (Department of Physics, University of Illinois, Urbana-Champaign)

16:18 [W8.006 Direct observation of melting of combed single DNA by fluorescence microscopy](#)
Peng-Ye Wang, Yu-Ying Liu, Shuo-Xing Dou, Wei-Chi Wang (Laboratory of Soft Matter Physics, Institute of Physics, Chinese Academy of Sciences, P.O. Box 603, Beijing 100080, China)

16:30 [W8.007 DNA thermal fluctuations and transcription](#)
G. Kalosakas, K.O. Rasmussen, A.R. Bishop (Theoretical Division, Los Alamos National Laboratory), C.H. Choi, A. Usheva (Harvard Medical School)

16:42 [W8.008 Large-Amplitude Thermal Fluctuations and Optical Excitations in DNA](#)
John Jean (Department of Biochemistry and Molecular Biophysics, Washington University)

16:54 [W8.009 Bubble nucleation and cooperativity in DNA melting](#)
Yan Zeng, Awrasa Montrichok, Giovanni Zocchi

17:06 [W8.010 Visualization of DNA partitioning in spherical pores](#)
Dmytro Nykypanchuk, David Hoagland, Helmut Strey (University of Massachusetts Amherst)

17:18 [W8.011 Conformation of packed double-stranded DNA in virus heads](#)
Christopher Forrey, Abhijit Sarkar, M. Muthukumar (University of Massachusetts)

17:18 [W8.012 Single molecule analysis of DNA synthesis using non-classical photon statistics](#)
S. Fore, Y. Yeh (UC Davis), T. Huser, R. Balhorn, M. Cosman, T. Laurence (Lawrence Livermore National Lab), NSF Center for Biophotonics Collaboration

[W8.013 Micropatterning stretched and aligned DNA using microfluidics and surface patterning for applications in hybridization-mediated templated assembly of nanostructures](#)

Jeffrey Carbeck, Cecilia Petit (Princeton University)

Session W9. DBP: Biomedical Physics II.

Thursday afternoon, 14:30, 510B, Palais des Congres

14:30 [W9.001 EEG synchronization and migraine](#)

Sebastiano Stramaglia, Leonardo Angelini, Mario Pellicoro (TIRES- Physics Department, Bari Italy), Kun Hu, Plamen Ch. Ivanov (CPS, Boston University and Harvard Medical School), TIRES Team

14:42 [W9.002 Neural - glial circuits : Can Interneurons stop seizures](#)

Suhita Nadkarni, Peter Jung (Dept. of Physics and Astronomy and Quantitative Biology Institute, Ohio University, Athens OH-45701)

14:54 [W9.003 Non-Random Fluctuations and Multi-scale Dynamics Regulation of Human Activity](#)

Kun Hu, Plamen Ch. Ivanov, Zhi Chen, H. Eugene Stanley (Center for Polymer Studies and Department of Physics, Boston University), Michael F. Hilton, Steven A. Shea (Harvard Medical School and Division of Sleep Medicine, Brighamamp;Womens Hospital)

15:06 [W9.004 Imaging Electrical Stimulation of the Human Cortex](#)

Sonya Bahar, Minah Suh, Ashesh D. Mehta, Theodore H. Schwartz (Department of Neurological Surgery, Weill-Cornell Medical College, 525 East 68th St., Box 99, New York NY 10021)

15:18 [W9.005 Effects of ischemic stroke on dynamics of cerebral autoregulation](#)

Zhi Chen, Plamen Ch Ivanov, Kun Hu, Eugene Stanley (Boston University, Physics dept and Center for Polymer Studies), Vera Novak (Harvard Medical School)

15:30 [W9.006 Long-Range Correlation in alpha-Wave Predominant EEG in Human](#)

Asif Sharif (Department of Physiology, University of Toronto), Der Chyan Lin (Department of Mech. amp; Ind. Engng., Ryerson University), Hon Kwan (Department of Physiology, University of Toronto), D.S. Borette (Division of Neurology, Toronto East General Hospital)

15:42 [W9.007 Chronic exposure to pulsed low-intensity microwaves is carcinogenic and tumorigenic](#)

Marjorie Lundquist (Bioelectromagnetic Hygiene Institute, Milwaukee, WI 53211-0831 USA)

15:54 [W9.008 Microencapsulation of Islets of Langerhans via selective withdrawal to achieve immunoisolation](#)

Jason Wyman, Shannon Dillmore, William Murphy, Marc Garfinkel, Milan Mrksich, Sidney Nagel (University of Chicago)

16:06 [W9.009 Liquid-on-Liquid Mixing for Slide-Based Biomedical Assays](#)

Richard C. Yeh, Carl Franck (Cornell University)

16:18 [W9.010 Blueberries and Tofu: Friend or Foe?](#)

Jennifer D'Ascoli, Susanne Lee (M.M.M. Laboratory, Physics Dept., University at Albany, State University of New York)

16:30 [W9.011 T lymphocytes hunt for antigen in lymph nodes like Lone Sharks](#)

Subhadip Raychaudhuri (University of California, Berkeley), Michael L. Dustin (New York University), Arup K. Chakraborty (University of California, Berkeley)

16:42 [W9.012 Cell Attachment Versus Mechanical Properties of Carbon Nanofiber Tissue Scaffolding](#)

V.M. Ayres (Michigan State University)

16:54 [W9.013 Transmission of Insult in Out-of-Position Subjects: III. Thoracic Spine Injury](#)

Saami J. Shaibani (Dept of Physics, Temple Univ)

17:06 [W9.014 Why Humans Die: an Unsolved Biological Problem](#)

Mark Ya. Azbel' (School of Physics and Astronomy, Tel-Aviv University, 69978 Tel Aviv, Israel+ and Max-Planck-Institute fur Festkorperforschung – CNRS,)

[W9.015 Calculation of Inertial Parameters to Find Dynamic Human Response](#)

Saami J. Shaibani (Temple University)

Session W10. DBP: Focus Session: Physics in Physiology II.

Thursday afternoon, 14:30, 510C, Palais des Congres

14:30 [W10.001 Statistical Physics Approaches to Respiratory Dynamics and Lung Structure](#)

Bela Suki (Boston University)

15:06 [W10.002 Noise-Enhanced Sensorimotor Function](#)

J.J. Collins (Dept. of Biomedical Eng., Boston University)

15:42 [W10.003 High-Resolution SQUID imaging of Magnetic Fields Generated by Propagating Cardiac Action Currents](#)

Jenny R. Holzer (Department of Biomedical Engineering, Vanderbilt University), Veniamin Sidorov, Luis Fong, Nicholas Peters, Petra Baudenbacher (Department of Physics and Astronomy, Vanderbilt University), Franz Baudenbacher (Department of Biomedical Engineering, Vanderbilt University)

15:54 [W10.004 Scale Invariance and Emergent Behavior in Spontaneous Activity of Heart Cells](#)

Netta Cohen (School of Computing, University of Leeds, Leeds UK), Horacio G. Rotstein (Department of Mathematics, Boston University), Erez Braun (Department of Physics, Technion-IIT, Israel)

16:06 [W10.005 Burst Dynamics and Coding in Electrosensory Neurons](#)

Brent Doiron (Physics Dept. University of Ottawa), Anne-Marie Oswald (Cellular and Molecular Medicine, University of Ottawa), Carlo Laing (Inst. Inform. Math. Sci. Massey University), Maurice Chacron (Physics Dept. University of Ottawa), Leonard Maler (Cellular and Molecular Medicine, University of Ottawa), Andre Longtin (Physics Dept. University of Ottawa)

16:18 [W10.006 Detection of Neuron Firing Using Microwave](#)

Joseph Zarycki, Cindy Chestek, Massood Tabib-Azar (EECS), Hillel Chiel (Biology), Steven Garverick (EECS), Case Western Reserve University Collaboration

16:30 [W10.007 Nanoscale Photosynthesis and the Photophysics of Neural Cells](#)

Elias Greenbaum, Tanya Kuritz, Elizabeth Owens, Ida Lee (Oak Ridge National Laboratory), Mark Humayun (Doheny Eye Institute)

16:42 [W10.008 Firing statistics of a neural model driven by long-range correlated noise](#)

Jason Middleton, Maurice Chacron, Benjamin Lindner, Andre Longtin (Department of Physics, University of Ottawa)

16:54 [W10.009 First-Passage and Residence Times in a Periodically Driven Integrate-and-Fire Model](#)

Peter Talkner, Michael Schindler, Peter Hänggi (Institut für Physik, Universität Augsburg)

17:06 [W10.010 Adaptation to the optimal learning rate in simple perceptron dynamics](#)

Peter Fleck, Alfred Hübler (Center for Complex Systems Research, Department of Physics, University of Illinois at Urbana-Champaign)

17:06 [W10.011 Self-tuning to the Hopf bifurcation in fluctuating systems](#)

Janaki Balakrishnan (Max-Planck Institut fuer Physik komplexer Systeme, Dresden, Germany AND Max Planck Institut fuer Mathematik in den Naturwissenschaften, Leipzig, Germany.)

THURSDAY AFTERNOON, 25 MARCH 2004,

17:30

Session X8. DBP: Teaching Biological Physics.

Thursday afternoon, 17:30, 510A, Palais des Congres

17:30 [X8.001](#) [An Interdisciplinary Graduate Laboratory for Biological Physics](#)

Raymond Goldstein (University of Arizona)

18:06 [X8.002](#) [A first-year physics course with a biophysical emphasis](#)

Robijn Bruinsma (UCLA)

18:42 [X8.003](#) [BIO2010 and beyond: What undergraduate physics does the next generation of molecular biology researchers need?](#)

Jonathon Howard (Max Planck Institute for Molecular Cell Biology and Genetics, Dresden, Germany)

19:18 [X8.004](#) [Teaching biological physics to non-physics majors via comparative biomechanics](#)

Steven Vogel (Duke University)

19:54 [X8.005](#) [An intermediate-level course on Biological Physics](#)

Phil Nelson (University of Pennsylvania)

Session X9. DBP: Physical Modeling of DNA Microarrays.

Thursday afternoon, 17:30, 510B, Palais des Congres

17:30 [X9.001](#) [Modeling of DNA microarray data using physical properties of hybridization](#)

G. A. Held (IBM TJ Watson Research Center)

18:06 [X9.002](#) [Molecular Models Underlying the Sensitive and Specific Determination of Copy Number Changes in the Human Genome and Transcriptome](#)

Stephen Laderman (Agilent Laboratories)

18:42 [X9.003](#) [Use of Langmuir Adsorption Isotherms to Predict Probe Response in Oligonucleotide Microarrays](#)

Stefan Bekiranov (Affymetrix)

19:18 [X9.004](#) [Progress toward 3D structure prediction of DNA and RNA](#)

John SantaLucia Jr. (Dept. of Chemistry, Wayne State University)

19:54 [X9.005](#) [Simple physical models for accurate oligonucleotide arrays](#)

Felix Naef (ISREC, Switzerland)

FRIDAY MORNING, 26 MARCH 2004, 08:00

Session Y8. DBP: Focus Session: Biomolecules in Solution.

Friday morning, 08:00, 510A, Palais des Congres

08:00 [Y8.001](#) [Density-of-states based Monte Carlo methods for simulation of biological systems](#)

Nitin Rathore, Thomas A. Knotts, Juan J. de Pablo (University of Wisconsin-Madison)

08:12 [Y8.002](#) [A new type of empirical, charge-dependent potentials for atomistic simulations in biophysical systems](#)

Steven Valone (Materials Science and Technology Division, Los Alamos National Laboratory), Susan Atlas (Department of Physics and Astronomy and Center for Advanced Studies, University of New Mexico, Albuquerque, NM)

08:24 [Y8.003](#) [Ab initio Molecular Dynamics Study of Glycine Tautomerization in Water](#)

Kevin Leung, Susan Rempe (Sandia National Laboratories)

08:36 [Y8.004](#) [Ab initio prediction of protein structure with both all-atom and simplified force fields](#)

Harold Scheraga (Baker Lab of Chemistry and Chemical Biology, Cornell University, Ithaca, NY 14853-1301)

09:12 [Y8.005](#) [Ab Initio Prediction of the Structure of G-Protein Coupled Receptors.](#)

William A. Goddard (Caltech)

09:48 [Y8.006 Atomic Charges for Classical Simulations of Polar Systems](#)

Hendrik Heinz, Ulrich W. Suter (Department of Materials, ETH Zurich)

10:00 [Y8.007 Solution Structure and Mechanical Properties of Anionic Glycosaminoglycans Computed via Molecular Simulation](#)

Mark Bathe (Mech. Eng., MIT), Gregory C. Rutledge (Chem. Eng., MIT), Alan J. Grodzinsky, Bruce Tidor (Elec. Eng. and Comp. Sci., Biol. Eng., MIT)

10:12 [Y8.008 Constant pH-Molecular Dynamics](#)

Freddie Salsbury (Wake Forest University), Michael Lee (USAMRIID)

10:24 [Y8.009 Ultrafast hydration dynamics of proteins](#)

Dongping Zhong (Dept. of Physics, Ohio State University)

10:36 [Y8.010 Condensates of semiflexible polymers](#)

Gerald Pereira (Department of Mechanical Engineering, The University of Sydney)

10:48 [Y8.011 Relaxation of HP protein chain into globular structure by a bond-fluctuation computer simulation model](#)

Johan Bjursell (George Mason University), Ras Pandey (University of Southern Mississippi)

Session Y9. DBP: Focus Session: Organismal Biomechanics.

Friday morning, 08:00, 510B, Palais des Congres

08:00 [Y9.001 Falling Leaves, Flapping Flight, and Making a Virtual Insect](#)

Z. Jane Wang (Cornell University)

08:36 [Y9.002 Diffusion of Asymmetric Swimmers](#)

Andrew Rutenberg (Dalhousie University, Canada), Andrew Richardson, Claire Montgomery (Dalhousie University)

08:48 [Y9.003 Building a better semicircular canal: could we balance any better?](#)

Todd Squires (Caltech Physics and Applied amp; Computational Mathematics)

09:00 [Y9.004 Buckling, Coiling, and Perversions of Viscoelastic Filaments](#)

Alain Goriely, Raymond Goldstein (University of Arizona)

09:12 [Y9.005 Active amplification by critical oscillators in hearing](#)

Frank Julicher (Max-Planck Institute for Physics of Complex Systems, Nöthnitzerstr. 38, 01187 Dresden, Germany)

09:48 [Y9.006 Limiting Frequency of the Cochlear Amplifier Based on Electromotility of Outer Hair Cells](#)

Mark Ospeck, Kuni Iwasa (NIH, Bethesda, MD 20851-8027)

10:00 [Y9.007 Quarter-Power Scaling of Primate Hearing Thresholds With Neocortex Volume](#)

Michael J. Harrison (Michigan State University)

10:12 [Y9.008 What Avian and Mammalian Sound Localization Have in Common](#)

J. Leo van Hemmen (Dept. of Physics, TU Munich, Germany)

10:24 [Y9.009 Synthetic Leaves: Pumping at Negative Pressures](#)

Tobias Wheeler, Abraham Stroock, Karen Havenstrite (Cornell University)

10:36 [Y9.010 Finite-element analysis of micro-indentation on pollen tubes](#)

Jean-Francois Bolduc, Anja Geitmann, Laurent J. Lewis (Universite de Montreal), Groupe de recherche en biomecanique et biomateriaux (GRBB) Collaboration

FRIDAY MIDDAY, 26 MARCH 2004, 11:15

Session Z7. DBP: New Developments in Understanding Bacterial Chemotaxis.

Friday midday, 11:15, 516C, Palais des Congres

11:15 [Z7.001](#) [Noise and unsteadiness of the chemotaxis network in a single bacterium](#)

Philippe Cluzel (The university of Chicago)

11:51 [Z7.002](#) [Heterogeneous receptor cross talk and high gain in bacterial chemotaxis](#)

Yuhai Tu (IBM T. J. Watson Research Center, Yorktown Heights, NY 10598)

12:27 [Z7.003](#) [An integrated model for signal transduction, motor control and pattern formation in E. coli](#)

Hans Othmer (School of Mathematics, University of Minnesota)

13:03 [Z7.004](#) [Timing bacterial chemotaxis](#)

Shahid Khan (University of Illinois)

13:39 [Z7.005](#) [Synthetic Multivalent Ligands as Probes of Inter-Receptor Communication in Bacterial Chemotaxis](#)

Jason Gestwicki (Stanford University)

Session Z8. DBP: Focus Session: Novel surface-based techniques for biomolecules and biomolecular thin films.

Friday midday, 11:15, 510A, Palais des Congres

11:15 [Z8.001](#) [Determination of viscoelastic parameters based on QCM measurements on many overtones](#)

Diethelm Johannsmann (Institute of Physical Chemistry, TU-Clausthal, Germany)

11:51 [Z8.002](#) [Measurements to Study Supported Lipid Bilayer Formation Resulting from Vesicle Fusion](#)

Curtis Frank (Stanford University)

12:27 [Z8.003](#) [Optimisation of Hydrogel Biointerface Layers used for QCM Detection of Biomarkers](#)

Shawn Carrigan (McGill University Biomedical Engineering Dept), George Scott (MDS Pharma Services), Maryam Tabrizian (McGill University Biomedical Engineering Dept)

12:39 [Z8.004](#) [Reversible, Light-Regulated Desorption of Photoactive Polyelectrolytes from Lipid Bilayers](#)

Jason J. Benkoski, Aldo Jesorka, Fredrik Höök, Bengt Kasemo (Chalmers University of Technology, Gothenburg Sweden)

12:51 [Z8.005](#) [DNA Electrophoresis on Micro-Patterned Surfaces](#)

Eric Petersen (Ward Melville High School), Bingquan Li, Vladimir Samuilov, Miriam Rafailovich, Jonathan Sokolov (SUNY Stony Brook)

13:03 [Z8.006](#) [Novel Method for the Investigation of the Morphologies of biological Self-Assembled Monolayers](#)

Arum Amy Yu, Francesco Stellacci (Department of Materials Science and Engineering, MIT), Julie Norville, Marc Baldo (Department of Electrical Engineering and Computer Science, MIT), Barry Bruce (Department of Biochemistry and Cellular and Molecular Biology and; Knoxville), Baldo Collaboration, Bruce Collaboration

13:15 [Z8.007](#) [Scanning Probe Recognition Microscopy for Investigation of Multi-scale Biological Problems](#)

Q Chen, Y Fan, L Udpa, V.M. Ayres (Michigan State University)

13:27 [Z8.008](#) [In Situ X-ray Reflectivity Studies of Protein Adsorption onto Functionalized Surfaces](#)

A.G. Richter, C. McCay (U of Memphis), J. Wang (Argonne National Lab)

13:39 [Z8.009 Highly Sensitive Detection of Processes Occurring Inside Nanoporous Anodic Alumina Templates a Waveguide Optical Study](#)

K.H. Aaron Lau, Le Shon Tan (Institute of Materials Research and Engineering, Singapore), Kaoru Tamada (Departments of Chemistry and of Materials Science, National University of Singapore), Melissa S. Sander (Institute of Materials Research and Engineering, Singapore), Wolfgang Knoll (Departments of Chemistry and of Materials Science, National University of Singapore), Institute of Materials Research and Engineering Collaboration, Departments of Chemistry and of Materials Science Collaboration

13:51 [Z8.010 Observation of polaron states in DNA induced by chemical doping process](#)

Masashi Furukawa, H. S. Kato, Maki Kawai (RIKEN, Japan), M. Taniguchi, T. Kawai (ISIR, Japan), T. Hatsui, N. Kosugi (IMS, Japan), T. Yoshida, M. Aida (Hiroshima Univ., Japan)

[Z8.011 Visualization of Cytoskeletal Elements by the Atomic Force Microscope](#)

Tamara Berdyeva (Dept of Physics, Clarkson University), Craig Woodworth (Dept of Biology, Clarkson University), Igor Sokolov (Dept of Physics, Clarkson University)

[Z8.012 DNA Chain Dynamics in Surface Electrophoresis](#)

Bingquan Li, Xiaohua Fang (department of materials science, stony brook university), Youngsoo Seo (NCNR,NIST), Vladimir Samuilov, Miriam Rafailovich, Jonathan Sokolov (department of materials science, stony brook university)

[Z8.013 Surface Electrophoretic Cell using ITO conducting walls](#)

PERUMAL RAMASAMY, VLADIMIR SAMUILOV, JONATHAN SOKOLOV, MIRIAM RAFAILOVICH (GARCIA center for polymers at engineered surfaces, Department of materials science and engineering , SUNY stonybrook , Newyork , 11790)

Session Z9. DBP: Focus Session: Materials Physics in Biology.

Friday midday, 11:15, 510B, Palais des Congres

11:15 [Z9.001 Scanning Probe Microscopy in the Visualization of Biological Ultrastructures: From Macromolecular Crystals to Human Pathogens](#)

Alexander Malkin (Department of Chemistry and Materials Science, Lawrence Livermore National Laboratory, CA 94551, USA)

11:51 [Z9.002 Liquid-Solid transition in nuclei of protein crystals](#)

Aleksey Lomakin, Neer Asherie, George Benedek (Massachusetts Institute of Technology)

12:27 [Z9.003 Synchrotron X-ray Microbeam Diffraction from Abalone Shell](#)

Elaine DiMasi (Brookhaven National Laboratory), Mehmet Sarikaya (University of Washington, Seattle)

12:39 [Z9.004 Ordering of Filamentous Proteins and Associated molecules via Micro-channel Confinement](#)

L.S. Hirst, Z. Abu Samah, E Parker, Y Li, R Pynn, N.C. MacDonald, C.R. Safinya (Materials and Physics Departments, Biomolecular Science and Engineering Program, University of California, Santa Barbara.)

12:51 [Z9.005 Interactions of biological molecules with inorganic surfaces](#)

R.L. Willett, L.N. Pfeiffer, K.W. West (Bell Laboratories, Lucent Technologies)

Session Z10. DBP: Focus Session: Molecular Biology and Computation.

Friday midday, 11:15, 510C, Palais des Congres

11:15 [Z10.001 Molecular Dynamics of Proteins on a Machine Designed for Quantum Chromodynamics](#)

James Davenport (Brookhaven National Laboratory), X. Cai, Y. Deng (Stony Brook University), J. Glimm

- 11:27 [Z10.002 Modeling Competitive Evolution on a Smooth Landscape](#)
Morten Kloster (NEC Laboratories America, Inc.)
- 11:39 [Z10.003 How much does horizontal gene transfer affect the phylogenetic tree of bacteria?](#)
Bin Tang, Philippe Boisvert, Paul Higgs (Dept of Physics, McMaster University, Hamilton, Ontario.)
- 11:51 [Z10.004 Combinatorial control of gene expression from simple molecular interactions](#)
Terence Hwa (Physics Dept and Center for Theoretical Biological Physics, UC San Diego)
- 12:27 [Z10.005 Engineering Cells with Computation and Signal Processing](#)
Ron Weiss (Dept. of Electrical Engr., Princeton University)
- 13:03 [Z10.006 Clustered bottlenecks in mRNA translation and protein synthesis](#)
Tom Chou (UCLA), Greg Lakatos (UBC)
- 13:15 [Z10.007 Analysis of informational redundancy in the protein-assembling machinery](#)
Simon Berkovich (The George Washington University)
- 13:27 [Z10.008 Solving the phase problem of X-ray crystallography using Genetic Algorithm](#)
Yi Zhou, Wu-Pei Su (University of Houston)
- 13:39 [Z10.009 Using three-dimensional protein structure to model protein aggregation: Collagen fibrillogenesis in vitro](#)
*Darren Anderson, Ivan Graovac (University of Toronto), Jan Rainey (PENCE - University of Alberta),
M. Cynthia Goh (University of Toronto)*
- 13:51 [Z10.010 Stabilization of surface-immobilized enzymes using grafted polymers](#)
Yevgeny Moskovitz, Simcha Srebnik (Technion - Israel Institute of Technology)
- 14:03 [Z10.011 Toward an atomistic model for predicting transcription-factor binding sites](#)
*Robert Endres, Thomas Schulthess (Oak Ridge National Laboratory, TN, USA), Ned Wingreen
(Princeton University, Department of Molecular Biology, NJ, USA)*