

THE BIOLOGICAL PHYSICIST

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Send Us Your Lab Websites!!

In an effort to update the DBP website, we would like to include links to various laboratories and biological physics departments. Please send your lab weblinks to Dan Gauthier (dan.gauthier@duke.edu), the DBP Website Coordinator, if you would like DBP to include a link to your lab's home page. And while you are at it, make sure you put a link to <http://www.aps.org/DBP> on your site, too!

Don't forget to register for the March Meeting!

Sonya Bahar

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Physics in the Biosciences: A New IOP Initiative

Peter Main & Peter Cooper

Physics and physics techniques underlie much of science. This is no less true in the biosciences, where an understanding of the nature of matter and the forces that mould it are increasingly important in elucidating and predicting the fundamentals of living systems. In particular, physics has a major role to play in areas such as biomaterials and bioengineering, informatics, imaging and biophotonics, bioelectronics and nanobiology, as well as molecular and cellular science.

Many physicists in the UK are already working in areas such as these, and there is a growing number of interdisciplinary initiatives. But researchers still encounter considerable obstacles, not least the separation of research funding between the physical and biological sciences. In addition, physicists and biologists usually publish in different journals, attend different conferences and work in different buildings.

To try to overcome these problems and to stimulate high-quality multidisciplinary research, the Institute of Physics has launched a new initiative called Physics in the Biosciences. This project is concerned particularly with areas that provide fundamental intellectual challenges for both communities. For example, the imaging and modelling of complex atomic structures and molecular processes developed by physicists can be used to understand the genetic processes underlying gene expression.

The initiative provides a forum for physicists involved in the bioscience area to network, exchange information and participate in conferences. It will also use its influence with the research councils, funding bodies and other relevant institutions to ensure that research, and researchers, in this area are not disadvantaged relative to their colleagues whose work might fall squarely within a single discipline. The Institute also stages activities for researchers in the field, either on its own or working with other bodies.

To link and inform physicists working in the biosciences, a “virtual forum” has been established, to provide information and to keep physicists up to date with developments in the field. No charge is made and all communication is electronic. The Forum has its own web site (<http://biosciences.iop.org>), containing the latest information on the initiative and its activities, as well as information on, and links to, relevant groups within the Institute and other organisations. An email discussion list enables members of the forum to network electronically and the site hosts a Bulletin Board, jointly with the research councils (which supply most of the UK research funding) to assist in the development of their programmes in this area. The site also contains reports on relevant meetings and will have links to tutorial material in the biological field.

Although funding agencies have been active in encouraging and supporting scientists who

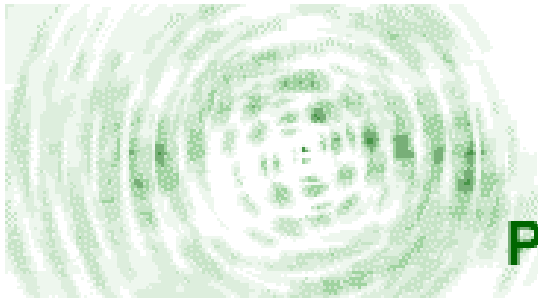
work at the interface between physics and biology, the Institute believes that there is more to be done. To this end it is creating links and holding discussions with the research councils, other funding bodies and the UK government's Office of Science and Technology. It is also closely in touch with a parallel initiative of the Royal Society of Chemistry, and is discussing its plans with the British Biophysical Society, the Biochemical Society, the Institute of Biology and other UK professional societies.

To encourage greater dialogue between the researchers themselves, the Institute is organising and collaborating in events designed to bring the two communities together. For example, in April, experts from the Institute and the Wellcome Trust, a major charity that funds medical research, held a workshop to explore new opportunities in specialist areas of interdisciplinary research. A substantial event will be held at the Institute's Congress meeting in April, where there is also a workshop for physicists new to

the biosciences area. The Institute is also planning to hold seminars to discuss issues arising from cross-disciplinary activity, such as funding, training and the supply of skilled people.

The Physics in the Biosciences initiative is in its infancy. It is overseen by a steering group made up of individuals who are active and influential in physics and the biosciences and who work closely with staff from the Institute. Membership of the forum is free and is open to non-members of the Institute.

For more information and to register interest in the initiative, visit <http://biosciences.iop.org> or contact peter.main@iop.org.



Physics in the Biosciences

DBP's New European Counterpart: The Division of Physics in Life Sciences (DPL) of the EPS

Per-Anker Lindgard

A new division, in many ways an analogue to the APS division of Biological Physics, has been created this spring by the European Physical Societies (EPS). It is called the Division of Physics in Life Sciences (DPL).

A lot of physicists feel tempted – rather than scared – by the challenges and possibilities offered by ‘life systems’. It could be the challenge to understand ‘just’ the properties and functions of a single bio-molecule like a protein, RNA or DNA – or the organization of a cell - or of individuals in a society – or of a feed back control mechanism etc. There seems to be no limit to what new fields or disciplines physicists feel they may contribute to. The traditional boundaries between physics, chemistry, biology, medicine, sociology, economics, etc., have been outgrown. Yet, they generally stay in their physics departments and feel at heart like physicists. (That is why they naturally belong to the physical societies). So why do physicists not stay with their reasonably well-defined – or perhaps rather self-defined - problems and develop tools or theories to quantitatively understand these to the very bottom.

If physicists are useful in other fields, why do they not just move there (some do) – or why do new students not go directly into those other fields (many do). The reason, I believe, is the peculiar attitude physicists tend to have: Rather build a new instrument than buying one, rather develop a new theory than applying one, or rather make a new computer code than buying one, rather understand a small corner, a principle, than knowing a lot

of facts. Waste of time in many cases perhaps, but it is that attitude, which counts, I believe. A field like biology in a broad sense is more and more in demand of new quantitative techniques, new visualization techniques, new simulation techniques etc. That is where physicist can help in many cases. What counts is that peculiar attitude. And to nurse that is why the students should go through the physics training and the physicist should keep their contact with physics colleagues in the Physical Societies.

All right, it may not be necessary to tell the members of DBP that – they may even not agree with it.

But there is a danger going ‘inter-disciplinary’; at least so far. That shows up in peer reviewed funding systems. There is a natural human tendency to look after ones own babies – the others may be left to play the role of lonely wolves or sharks. A division in a physical society can perhaps make a family for those creatures. Another danger is that it may be quite un-awarding to ‘go basic’. The public does not understand the importance of a new principle, but can much better relate to results. For example a visualization made by NMR spectroscopy of some effect of a disease – or a magneto-encephalic visualization of activating parts of the brain after some stimulus – or visualising lungs with ^3He . It is the visualization and the subject, which count, not the techniques (invented by the physicists). The experts understand and appreciate the importance of the technical advances, but hardly the public or the politicians. That is an area where a division in a physical society may

help keeping up the visibility of the contributions made by the physicists.

However, when it really comes down to the crux of the matter for us, it is the subject, the physics that is interesting. Therefore making meetings, summer schools and workshops on interesting new stuff and getting inspiring, innovative people together, that is probably really the 'raison d'être' for a Division dealing with physics and biology. For example, I find it fascinating to hear about the rapid developments in isolating and in measuring on single bio-molecules – measuring precisely the forces needed to pull a protein apart or to stretch DNA – not to speak of the possibilities offered by big physics machines: neutron scattering, synchrotron and free electron laser facilities. Also, I find it great that by computer simulation it is now beginning to be possible realistically to study the protein folding process. The progress is so fast, interesting and promising.

Last year I was vice president of the European Physical Society (online at <http://www.eps.org/>). It has more than twice as many members as APS: 80.000 belonging to the National societies of 37 European countries. So although it is rather loosely organized, it should include many biologically oriented physicists. But we had no such division. Science funding at the European level is made by the European Union (EU). Although it amounts to only 5% of the total science funding, it has a much larger influence – also on the national funding strategies. Therefore it is important that the learned societies are heard for advice and for providing experts for evaluation panels etc. Last year EU decided that nano- and bio- science/technology should be two of very few high priority area in the next funding round, the so-called framework 6. In response to this, and because we felt biological physics was a new expanding field, the executive committee of EPS set up a 'reflection committee' to see if the idea of creating a new division was generally

supported. You may see more details on the web page DPL.risoe.dk.

We gave it the more general name the Division of Physics in Life Sciences because we foresee that sections in for example physics in medicine etc. could be coming soon. But we start out with very much the same scope as the APS Division on Biological Physics. And we will be very happy to collaborate in any way. After all physics is worldwide. The EPS council approved the new division in 23 of March 2002. I was asked to be the first chairman to get it going. We had a first meeting of the board and guests in connection with a workshop on 'Nano Physics in Life Systems' 21-22 of June in Copenhagen. We are pleased to have collected a board of very good physicists, many of whom you would know, see DPL.risoe.dk, covering a broad range of fields and nationalities. We were furthermore very pleased to have the DBP chairman Bob Austin as a guest at our first board meeting. One common project for DBP/DPL could be to offer to help in the organization of a rather large meeting on Biological Physics in Gothenburg August 2004, planned by IUPAP.

The scientific part of the June workshop was very interesting and collected about 80 participants – rather more than we had planned for. There will be proceedings published in J.Phys.C. around March 2003. That gives a very good occasion to present the scope of the new Division of Physics in Life Sciences. Furthermore, it marks the beginning of new trend in J.Phys.C. They offer to welcome and publish papers in biological physics, recognizing this (or part of this) to be an important emerging field of physics closely related to condensed matter physics. As another activity of the division we had a workshop on 'Dynamics of Biological Molecules and Networks', 10-17 of August in Krogerup, Denmark organized by NORDITA. Organizers of future meetings are most welcome to contact me via email at p.a.lindgard@risoe.dk, if they wish their

meeting to be included in the EPS/DPL activities and enjoy the benefits of that.

I may finally mention that we have made good contacts also with our colleagues in Biophysics, namely with EBSA, the European Biophysical Societies Association. A collected effort to establish contact with EU will be attempted.

As you can see, we have just started, but we hope to grow fast as the DBP division has done. Anyone interested is welcome to join. I am sure many physicists from Europe look at the excellent DBP web page and the present newsletter. Therefore let me say: If you are a member of a Physical Society associated with

EPS it is for free to join DPL. The more members we get, the more activities and influence we may get – and the better we can, together with DBP and other similarly interested groups, further the interest in and of the field.

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DBP Election Update: Call for Nominations

Mark Spano

The Division of Biological Physics is currently seeking nominations for the following four offices on the Executive Committee of the Division:

Vice-Chair (who becomes Chair-Elect, Chair, and Immediate Past Chair in sequence)

Chair-Elect (due to the resignation of our current Vice-Chair)

These two offices are in the direct line of the Division leadership. The duties of the Vice-Chair are to organize the DBP tutorials at the March Meeting. Upon becoming Chair-Elect, he/she assumes responsibility for organizing the March Meeting Program for the Division, including soliciting proposals for symposia and focus sessions and for producing the final DBP March Meeting Program. The Chair oversees the day-to-day operation of the Division and is responsible for initiating programs (conferences, collaborations, and other policies) that help promote and nurture the Division. In the final year of service as Past-Chair, he/she serves as chair of the nominating committee and generally provides continuity to the programs and policies of the Division.

TWO At-Large members of the DBP Executive Committee (3-year terms)

The duties of At-Large Members of the ExCom are open, but generally consist of service on the several committees of the Division (which include, but are not limited to, the Program Committee, the Fellowship Committee, and the Nominating Committee) and is also expected to conceive and aggressively to pursue ideas that support the mission of the Division.

If you are interested in contributing to the Division, to help it to grow, and to encourage students to contribute to the field, please submit a nomination by e-mail to mark.spano@mailaps.org. A complete nomination package consists of your name, address, telephone number(s), and e-mail address, plus two concise paragraphs, one being a brief biography and the other being a short statement of intent detailing why you wish to serve the Division and what agenda you would like to promote. These will be published as part of the election process.

All nominations must be received by January 13, 2003.

Dr. Mark L. Spano
Immediate Past Chair &
Chair, Nominating Committee,
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HUMAN FRONTIER SCIENCE PROGRAM (HFSP)

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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 the theme of **complex mechanisms of living organisms**.

CALL FOR LETTERS OF INTENT TO APPLY FOR A RESEARCH GRANT FOR AWARD YEAR 2004

The HFSP research grant program places strong emphasis on the involvement of other disciplines such as chemistry, physics, mathematics, computer science and engineering in projects within the general areas of neuroscience and molecular approaches to 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. To stimulate novel, daring ideas and innovative approaches, 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.

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. Preference is given to intercontinental teams. The size of the team should normally be 2 – 4 members with not more than one member from any one country, unless this is 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 a standard amount of \$250,000 per year for the whole team.

Program Grants may be applied for by 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.

Deadline for Letters of Intent: 2 APRIL 2003

*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.

Guidelines and application forms are available on the HFSP web site (www.hfsp.org)