



Energy and Life - 12th Hermann Staudinger Lecture with Sir John E. Walker

While being in Freiburg for the occasion of the bio-energetics conference EBEC, Professor Sir John E. Walker held the 12th Hermann Staudinger lecture with an overview of his work, his inspirations, and bio-energetics as a whole on September 14th.



John Walker studied chemistry in Oxford where he also received a Ph.D. in 1969. After a few years spent abroad he accepted an invitation in 1974 from Fred Sanger who at that time was sequencing mitochondrial DNA

in Cambridge. From then on his work was dedicated to the fields of mitochondrial research and bio-energetics. In 1997 he received, together with Paul D. Boyer, the Nobel Prize in chemistry for their brilliant insights into the mechanics of the ATP-synthase.

Fossil fuels - stocks of solar energy converted into carbohydrates that accumulated over 1000 million years - will inevitably run out. This concern drove the speaker to start his lecture with a simple question: "Where does our energy come from?", and he directly provided the simple answer: "From our sun".

The only way, according to Walker, to satisfy our greed for energy is to harvest sunlight more efficiently. John E. Walker persuaded the audience that a better understanding of bio-energetics will allow us to tailor and engineer biology to be able to do just that.

(Moritz Buck)

>>>

Podcast and pictures are available at www.frias.uni-freiburg.de/hsl

EBEC 2012 – European Bioenergetics Conference – in Freiburg

More than 30 years ago in 1980 the first European Bioenergetics Conference (EBEC) was held in Urbino, Italy. This year from September 15-20 the 17th EBEC took place at the Albert-Ludwigs-Universität in Freiburg. The EBEC 2012, organized by Prof. Thorsten Friedrich from the Institute of Organic Chemistry and Biochemistry, brought together about 600 researchers from around the world to present their latest achievements in the area of molecular and cellular bioenergetics. Throughout the conference each day started with plenary lectures, with three parallel symposia in the afternoon including presentations of selected posters. The opening of the conference included the "Peter Mitchell Medal Lecture", and the following days covered most of the bioenergetics-relevant topics: ATP synthase; electron transport complexes; photosynthesis; mitochondrial structure and dynamics; reactive oxygen species and ageing.

Creating algorithms to turn images into cell models

In the July issue of *Nature Methods*, LifeNet External Senior Fellow Robert F. Murphy describes an image-based search system based on patterns, not words. For example, if scientists have an image of a marker protein that clusters in a certain way in the endoplasmic reticulum, they can search for images with similar patterns using the image database system OMER0.

Such searches can work in situations where those relying on written descriptions would fail, says Murphy. "What if there's a pattern and no one knows what to call it?"

(Cho, B.H., Cao-Berg, I., Bakal, J.A. & Murphy, R.F. *Nature Methods* 9, 633–634, 2012).

Bob Murphy is also featured in the same issue in "the author file".

>>>

Report on the Capri Fall School on "Non-equilibrium processes & fluctuation-dissipation theorems"

For the third time since its inception the FRIAS School of Soft Matter Research brought together researchers from diverse communities to the beautiful island of Capri for the "Capri Fall Workshop".

From September 9th to 16th almost 50 scientists from all over the world had the opportunity to discuss topics regarding "Non-equilibrium processes & fluctuation-dissipation theorems". They presented their latest findings in the Villa Orlandi in the village of Anacapri, the perfect inspirational setting for the development of new ideas. Among the many prominent guests were professors Shin-ichi Sasa (University of Tokyo), Shaul Mukamel (University of California at Irvine and FRIAS External Senior Fellow), Yuli Nazarov (Delft University), Pierre Gaspard (University of Brussels), Udo Seifert and Rudolf Hilfer (both University of Stuttgart), and many other leading researchers and contributors from ca. 20 different countries.

A broad spectrum of non-equilibrium processes in systems ranging from the electronic level up to colloidal suspensions was discussed. Even macroscopic thermal engines were presented, as well as "quantum heat engines", requiring theories of classical as well as quantum fluctuations and, of course, the theory of classical thermodynamics. The latter and its probably most famous and most representative quantity, the entropy, turned out to be the target of various attempts to transfer this so successful and well-established concept to the microscopic world of atoms and electrons – which led at times to controversial but always tremendously fruitful discussions. All participants agreed that the scientific program as well as the organization of the event was, as in the past, exemplary, outshining many commercial conferences with its perfect mixture of professionalism and flexibility.

(David Kauzlaric)

Fellowships 2012 / 2013

Junior Fellows:

- Maria Asplund: "Conducting polymers for neural interfaces"
- Karen Lienkamp: "Micro- and Nano-structured Materials – Combining Shape, Size and Chemical Functionality"
- Florian Mintert: "Coherent many-body quantum dynamics"
- Francesco Rao: "Dynamics of Complex Systems in Biophysics"
- Stefan Schiller: "Combining macromolecular chemistry with synthetic biology, including genetic engineering of proteins to access biolohybrid materials and nano-architectures"

Internal Senior Fellows:

- Ingo Crossing: "Development and application of weakly coordinating anions: Free volume and Ionic Liquids, polymerization chemistry and investigation of a unified Bronsted acidity scale"
- Günter Reiter: "Orienting semi-crystalline conjugated polymers through dewetting and nucleation control"
- Margit Zacharias: "Inorganic-organic Interfaces on the Nanoscale"

External Senior Fellows:

- Shaul Mukamel: "New Directions in Multidimensional Optical Spectroscopy of Photosynthetic Complexes and Proteins with Classical Optical Fields and Entangled Photons; Theoretical and Simulation Studies"
- Maria Anita Rampi: "Synthesis and electrical characterisation of azoacenes: A new family of photoswitchable semiconducting organic compounds"
- Natalie Stingelin: "Electronic processes in organic soft matter"
- Sauro Succi: "Multiscale modeling of complex systems dynamics"
- Osamu Tabata: "Configurable self-assembly of DNA functional blocks"

>>>





Group Picture BFF 8

Report on the Black Forest Focus 8 (BFF8): Electronic and Excitonic Transport in Soft Matter

Organized in Schluchsee on a beautiful lake in the Black Forest from October 10th to 14th, the BFF8 workshop brought together about 60 top international scientists.

The conference participants were leading researchers in conjugated semiconducting materials and interested in deciphering their electronic and excitonic transport properties.

The BFF8 workshop succeeded in covering the whole spectrum of organic optoelectronic material science both from the experimental and the theoretical points of view. The focus was on scientific problems related to absorption of photons, dynamics and kinetics of newly excited states, charge separation and transport with respect to molecular conformations and morphology. Another aspect of the workshop dealt with the fabrication of organic devices.

Taken together the BFF8 gave all participants

the possibility to learn about both the latest advances in the field as well as important challenges that need to be overcome in the future.

The workshop's poster session as well as formal dinners and coffee breaks stimulated constructive discussions and therefore had a significant added value for all concerned, making BFF8 a highly successful scientific event. *(Ioan Botiz)*

EVENTS TO COME

November 5, 2012

Anna Herland: *"Stem cell engineering of neural stem cells and differentiated neurons"*
FRIAS Seminar Room, 11:15 a.m.

November 12, 2012

Eli Pollak: *"Classical Rainbows and Quantum Coherences and Tunneling in Surface Scattering"*
FRIAS Seminar Room, 11:15 a.m.

November 19, 2012

Alessandro Laio: *"Exploring the universe of protein structures by atomistic simulations: beyond the Protein Data Bank"*
FRIAS Lecture Room, 4:15 p.m.

Fellowships 2012 / 2013

Junior Fellows:

- Hauke Busch: *"Systems biology of cellular decisions and cell-cell communication"*
- Jörn Dengjel: *"Spatio-temporal protein dynamics during autophagy"*

Principal Investigator:

- Melanie Börries: *"Systems Biology of cellular decisions and cell-cell communication"*

Internal Senior Fellows:

- Ralf Reski: *"Engineering Moss (e:MOSS)"*

External Senior Fellows:

- Celso Grebogi: *"Investigations of the behaviour of dynamical networks using a direct as well as an inverse approach"*
- Robert Murphy: *"Automated interpretation of fluorescence microscope images"*
- Jouni Uitto: *"Molecular Genetics of Heritable Skin Diseases"*

LifeNet Director Leena Bruckner-Tuderman elected vice-president of the German Research Foundation

At the announcement of the election results, the Speaker of the FRIAS Board of Directors, Professor Werner Frick, congratulated FRIAS fellows Strohschneider (new president) and Bruckner-Tuderman on behalf of the entire Board of Directors. He stated that being elected to these national positions, which are so highly significant within the German academic world, was a testament to both the academic achievements and leadership abilities of Ms Bruckner-Tuderman and Mr Strohschneider.

Leena Bruckner-Tuderman is Medical Director of the Freiburg University Medical Centre, Dermatology Department, and Academic Director of the FRIAS School of Life Sciences – LifeNet.

The medic Bruckner-Tuderman is a specialist

in dermatology and venereology. She was born in Finland and studied medicine at the University of Oulu, where she also went on to obtain her PhD. She qualified as a professor at the Zurich University in 1989. Her first professorship was at the University of Muenster followed by a guest professorship at the Harvard Medical School. She was appointed by the University of Freiburg in 2002. She has been a Fellow of the Freiburg Institute for Advanced Studies (FRIAS) and Director of the FRIAS School of Life Sciences – LifeNet since 2007.

In addition to her research activities, Bruckner-Tuderman is involved in numerous professional, academic and specialist associations, such as the German Dermatology Society and the European Society for Dermatological Research. Bruckner-Tuderman was a Heisenberg Fellow of the DFG in the 90ies and was part of the DFG Review Board for Medicine in the section entitled "Genetic and Metabolic Basis of Human Diseases". The multiple award winner also took part in various DFG Priority Programmes and Collaborative Research Centres as a coordinator and co-initiator. She has received national and international awards for her scientific research, including the Eva Luise Köhler Research Award.

EVENTS TO COME

October 25-28, 2012

DPT 2012: 16. Deutsche Physikerinnentagung
Registration required.

October 29, 2012

Ekaterina Shelest: *"Search and prediction of transcription factor binding sites: challenges and solutions"*

FRIAS Seminar Room, 11:15 a.m.

February 5, 2012

13th Hermann Staudinger Lecture with Nobel Laureate Peter Doherty
5:15 p.m. Anatomy Lecture Hall.

www.frias.uni-freiburg.de/lifenet-events



FRIAS

FREIBURG INSTITUTE FOR ADVANCED STUDIES
ALBERT-LUDWIGS-UNIVERSITÄT FREIBURG

www.frias.uni-freiburg.de/softmatter-events