

Scientists Discover New Human Disease

An international team of scientists led by Leena Bruckner-Tuderman, Director of the FRIAS School of Life Sciences – LifeNet and Medical Director of the Department of Dermatology, University Freiburg Medical Centre, has identified a new heritable disorder. It is complex, exhibits symptoms in multiple organs – affecting the skin, kidneys and lungs – and is caused by mutations in the

gene that regulates protein molecule integrin alpha-3. The findings have now been published in the prestigious *New England Journal of Medicine* (online at: <http://www.nejm.org/doi/full/10.1056/NEJMoa1110813>).

The newly-identified disease leads to severe breathing difficulties very soon after birth. In addition, sufferers' kidneys are affected by congenital nephrotic syndrome, which causes water and electrolytes to leak into body tissue. Special laboratory tests can identify the nephrotic syndrome which can then be treated by means of dialysis.

In future, an interdisciplinary collaboration of dermatologists, paediatricians and internists will seek to diagnose patients with genetic mutations affecting the protein molecule integrin alpha-3, with the aim of identifying further symptoms of this complex disorder.

Graphic Visualisation

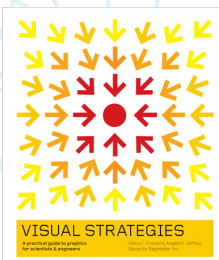
A FRIAS Workshop with Felice Frankel

Felice Frankel, science photographer and research scientist at MIT, is on a mission to raise awareness amongst scientists about the importance of visual communication. In a two

day workshop on April 24th and 25th, she trained us, a group of stubborn but enthusiastic scientists, into thinking and rethinking our approach to scientific graphics. Frankel insists it is not a matter of fancier pictures but about how improving our graphics helps us to think more clearly about our science.

Graphic presentation of results is an important part of everyday research communication. With increasing importance of interdisciplinary exchange it is evident that scientists are pushed to communicate the essence of their research in a clear and easy to grasp manner. The challenge is, of course, to achieve this without sacrificing scientific accuracy and meaningfulness.

Starting with our own submissions, Frankel showed us how even simple adjustments can significantly enhance the readability of our graphics. Clever use of graphical cues like color, shape and layers of information, highlight the most important content and guide the viewer to see what we want them to see. In



the same way cleaning up the picture to avoid superfluous distractions is essential to get a complicated message across. We also were made to face the fact that in a few years the option to include interactive graphics in one's work will be more or less

standard.

All in all, this workshop was playful, inspiring and at the same time extremely useful! One message we will definitely take home is not to let the software we use set the limits to our creativity. So get your color pencils out and go wild!

Baumeister Team Elucidates New Mechanism in the Sensation of Noxious Heat

LifeNet Fellow Ralf Baumeister's team eluci-

Junior Fellow Mateo-Alonso Accepts Call

Junior Fellow Aurelio Mateo-Alonso (Koke) has accepted an Ikerbasque Research Professorship at the Basque Excellence Research Center for Polymer Materials, POLYMAT Fundazioa, in Donostia-San Sebastian (Spain). After almost three years at FRIAS and twelve years since he left Spain, Koke is looking forward to going back to his home country – although he will miss FRIAS and his colleagues.

Michael Reed is Visiting Scientist from May to August 2012

Michael Reed joined the University of Virginia in 1997 after holding positions at Hewlett-Packard Laboratories, Carnegie-Mellon University, University of Twente, and ETH Zurich. He received his B.Sc. and M.Eng. degrees from Rensselaer Polytechnic Institute, and the Ph.D. from Stanford University. He was the General Co-Chairman of the 1996 IEEE International MEMS Workshop, and is the North American Editor of the journal *Sensors & Materials*. He currently has 16 issued and pending patents related to microsystems technology and microfabricated medical devices. Reed is the recipient of the Hertz Prize and a Presidential Young Investigator Award, and is a Fellow of the Institute of Physics.

He is working on "Nanometer Scale Control of Electrowetting on Polymer Dielectric Surfaces" with colleagues at IMTEK.

ICAM Annual Conference 2012

From May 24 to 26, the 2012 ICAM Annual Conference took place in New York at the New York University and the New York Academy of Sciences. Established in 1999, ICAM, the Institute of Complex Adaptive Matter is a distributed experiment-based multi-institutional partnership (FRIAS being one of the partners)

whose purpose is to identify major new research themes in complex adaptive matter. With 54 branch members in the Americas, Europe, Asia and Australia, ICAM aims to cluster more insight into not only Soft Matter, but also Biological Matter, Quantum Matter and New Materials for Sustainable Energy.

For this purpose, the organizers regularly bring together physicists, chemists, engineers and biologists assuming that most of the old and emerging questions in these fields can only be solved by an intense interplay between the different disciplines. Consequently the conference was structured around these four fields, with each block beginning with a general sketch of the most urgent questions, a couple of overview presentations, and, most interactive, a panel discussion with ample time for the exchange of sometimes very diverse thoughts and approaches.

Taken together the ICAM annual conference covered the science of emergence in Soft Biological Quantum Matter and energy matter, with frontier talks in each area from leaders in the field, ultimately aiming at possibilities for international outreach in science.



Report on the Black Forest Focus 7 (BFF 7) on Multidimensional Optical Spectroscopy and Imaging: Temporal and Spatial Resolution at the Cutting Edge

At the BFF7, which took place from March 15-17, 2012, two related but highly specialized fields were brought into contact: on the one hand there were presentations on multidimensional spectroscopy – showing huge progress in the analysis of the dynamics of molecular complexes; and on the other hand visualizations of individual properties of single

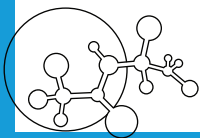


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Group Picture BFF 7

molecules were presented.

The scientific organizers Shaul Mukamel (ESF at FRIAS), Karsten Buse (director of the Fraunhofer IPM at Freiburg) and Hermann Grabert & Jan G. Korvink (FRIAS directors) brought together most of the key players in this important field of science from all over Europe, the United States and Japan. Amongst them were Rudolph Marcus (Caltech, Nobel laureate in Chemistry, 1992), Federico Carpasso (Harvard), Charles V. Shank (Janelia Farm) and Yeshiahu Fainman (UCSD). What was clearly evident was Mukamel's major role in defining this exciting field through his visionary papers, working as a theorist and keen friend of experimentalists, and admitting clear influences from Fourier transform NMR.

The conference and its many extensive discussions were not only fruitful for these pioneers of the field, but also for the participating junior scientists, who – due to the comfortable size of the conference – found many opportunities to informally rub shoulders with the “bigshots”, to be inspired, discuss issues, and share ideas.

Aurelio Mateo-Alonso Receives the 2012 SES Research Young Investigator Award

of the Fullerenes, Nanotubes, and Carbon Nanostructures Division of the Electrochemical Society (USA).

EVENTS TO COME

July 12-14, 2012

Energy Conversion: *Synergies between Biological, Chemical and Physical Approaches*, FRIAS Seminar Room

September 9-16, 2012

International Workshop on *Non-equilibrium processes and fluctuation-dissipation theorems*, Anacapri, Isola di Capri, Italia

October 10-14, 2012

Black Forest Focus on Soft Matter 8: *"Electronic and Excitonic Transport in Soft Matter"* Hotel Vier Jahreszeiten, Schluchsee, Black Forest Registration required.

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

dates a new mechanism in the sensation of noxious heat. The work, published online at *PloS One* (e32360, March 20, 2012), proposes that *C. elegans* uses different mechanisms for the perception of heat as back-up strategies to guarantee fast and efficient responses to potentially detrimental stimuli.

Moss Detects Air Pollution

Biologists working with Ralf Reski, Chair for Plant Biotechnology at the University of Freiburg, develop peat moss as a novel biological indicator to detect air pollution.

Since 1996 the European Union requests continuous monitoring of air pollution from their member states. This requirement was tightened in 2008 with an EU directive to monitor not only nitrogen oxides and sulfur oxides but also airborne heavy metals such as cadmium, lead and nickel. This is hard to achieve with existing technologies as they are either imprecise or very expensive.

Reski and his colleagues are part of a consortium that has been granted 3.5 mio € for three years by the EU within their initiative "Eco-Innovations!".

The consortium named "MOSSCLONE" consists of five academic partners and five small and medium enterprises (SMEs) and aims at developing a novel, precise and inexpensive method to monitor air contamination, especially by heavy metals. The MOSSCLONE partners are located in Germany, Spain, France, Italy and Ireland. The SMEs will contribute another approx. 1 mio € from their own resources to this project.

Natural Healing Proven in Congenital Skin Disorder

For the first time, scientists working in Leena Bruckner-Tuderman's group have

been able to show how the blotchy skin patterns characteristic of Kindler Syndrome arise as a result of 'natural healing', which corrects a defect in the Kindlin-1 gene. Although the natural healing phenomenon has also been described in several other rare diseases, a unique pattern is found in Kindler Syndrome patients where thousands of islands of healthy skin directly adjoin diseased areas. The findings have now been published in the renowned *Journal of Clinical Investigation* (doi:10.1172/JCI61976).

"We have uncovered the molecular mechanisms in this 'natural healing' process and were able to prove that the expression of the Kindlin-1 protein, which is restored as a result of repairing the mutation, normalises both the structure of the skin and important physiological functions of the skin cells," explains Bruckner-Tuderman. These new findings are highly relevant to the treatment of patients with both Kindler Syndrome and other congenital skin disorders. They open up new avenues for cell therapy – treatment approaches using patients' own skin cells that have spontaneously healed.

EVENTS TO COME

September 14, 2012

12th Hermann Staudinger Lecture with Nobel Laureate John Walker 2:15 pm. FRIAS Lecture Hall.

September 15-20, 2012

EBEC 2012: The 17th European Bioenergetics Conference University of Freiburg Registration required.

October 25-28, 2012

DPT 2012: 16. Deutsche Physikerinnentagung Registration required.

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