Physics

Thin Films, Bright Future
By Hubert Filser

LMU physicist Alexander H"ogele studies ultrathin semiconducting films and carbon nanotubes, which possess astonishing physical properties. He has now received the second highly endowed European Research Council grant in his career. For the complete article, see www.en.lmu.de/news/insightlmu/2017/04_01.pdf

"We study functional materials at the atomic scale": Alexander H"ogele in the cleanroom.

"Much remains to be done in the field of Holocaust Studies"
by David Lohmann

Dr. Kim W"unschmann has joined LMU to expand the cooperation between the Chair for Contemporary History and the Center for Holocaust Studies at the Institute of Contemporary History in Munich.
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Asocial Media
Moderators: Maximilian Burkhart and Martin Thurau

Social media have become a conduit for abuse, harassment, death threats. In insightLMU, communications experts Christoph Neuberger and Carsten Reinemann discuss irate citizens, narcissists, trolls – and politicians.
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Bringing fuzzy edges into focus
by Simon Kirner

Like many experimental physicists Florian Sch"uder is a tinkerer. He is fascinated by the notion of one day being able to visualize the biochemical machines that carry out basic cellular processes at the level of single molecules. For the work described in insightLMU he received the CeNS Nano Innovation Award.
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More news on LMU Munich at www.en.lmu.de/news
“Much remains to be done in the field of Holocaust Studies”

By David Lohmann

Dr. Kim Wünschmann has joined LMU to expand the cooperation between the Chair for Contemporary History and the Center for Holocaust Studies at the Institute of Contemporary History in Munich.

More than 70 years have past since the end of the Second World War, and historians of the Nazi era and the Holocaust are increasingly confronted with claims that their field has become obsolete. One of Dr. Kim Wünschmann’s goals is to refute this false assumption – in particular on the part of students who may feel that there is nothing more to find out about the events of those years. “It is important to systematically examine empirical data and to interpret them in innovative ways,” she explains. In addition, the questions that historians ask must constantly be reframed in the light of new scholarly approaches to the past – among them, the growing awareness of the gender-specific nature of historical experience.

In September 2017 Wünschmann joined the School of History at LMU as a Research Associate charged with coordinating the joint activities of the Chair for Contemporary History and the Center for Holocaust Studies at the Institute of Contemporary History (IfZ) Munich-Berlin. Having earned an M.A. at the Free University of Berlin, she obtained her PhD in History at Birkbeck College, University of London in 2012. She then worked as a Post-Doctoral Research Fellow at The Hebrew University of Jerusalem, and later served as DAAD Lecturer in Modern European History at the University of Sussex in Brighton.

In a study of “The Present Status of University Teaching on the Holocaust” published by the Free University of Berlin (FUB) in 2016, LMU’s history program scores highly. This is attributable in part to the School’s close collaboration with the Center for Holocaust Studies at the IfZ. The Center was set up in 2013. Last year the Federal and State Governments agreed to secure its long-term funding. One of the Center’s principal aims is to ensure that the origins and history of the Holocaust receive the attention they deserve at university level. Kim Wünschmann’s appointment represents a further step in that direction. Her task is to effectively incorporate new research findings and methods into the curriculum, to establish a firm basis for further studies of the Holocaust and to stimulate international research collaborations.

“Critical Thinking based on analysis of the evidence is a major bulwark of democracy.”

Unfortunately, many universities seem to share the notion that the Holocaust has already been exhaustively analyzed. “But that is an erroneous assessment,” says Wünschmann, and points to the conclusions reached by the FUB study mentioned above. Simply collecting and collating the evidence is not enough, she adds, findings must be critically discussed and widely disseminated – especially at a time when oversimplified nationalistic perceptions of the past are once again on the rise. “In my view, the creation of the position I now hold was a conscious policy decision, taken with a view to countering the tendency to ignore the topic, and, at the same time, uncovering new aspects of what it has to teach us.”

Together her colleagues Professor Frank Bajohr and Dr. Andrea Löw from the Center for Holocaust Studies, Wünschmann has recently initiated a Research Colloquium on The Holocaust and Its Contexts. “This new forum will deal with what I think is a very important issue: We need to situate the Holocaust within the wider context of the history of violence in the 20th century.” With the help of a Fellowship Program, the organizers hope to attract many visiting researchers from abroad. There are also plans for the publication of an annual English-language yearbook, to be launched in 2018. Dedicated Workshops and Summer Schools will particularly encourage young researchers to delve into underexposed issues.

“Knowledge of the history of antisemitism, of the dynamics of inclusion and exclusion and the role of violence in processes of social change helps us to analyze our present situation,” Wünschmann points out, “and critical thinking based on analysis of the evidence is a major bulwark of democracy.” Many areas of this story that have yet to be fully explored – for example, people’s motives to help others, she says. In other words, “much remains to be done.”

Translation: Paul Hardy

http://kurzelinks.de/u8fo
http://kurzelinks.de/hibc

**The Archaeopteryx that wasn’t**

Paleontologists at LMU correct a case of misinterpretation: The first fossil “Archaeopteryx” to be discovered is actually a predatory dinosaur belonging to the anchiornithid family, which was previously known only from finds made in China. LMU’s Oliver Rauhut and Christian Foth (Staatliches Museum für Naturkunde, Stuttgart) have re-examined the so-called Haarlem specimen of Archaeopteryx, which is kept in Teylers Museum in that Dutch city. In the journal *BMC Evolutionary Biology*, they now report that this fossil differs in several important respects from the other known representatives of the genus Archaeopteryx. Instead, the scientists assign the fossil to a group of bird-like maniraptoran dinosaurs known as anchiornithids, which were first identified only a few years ago based on material found in China. “The Haarlem fossil is the first member of this group found outside China. And together with Archaeopteryx, it is only the second species of bird-like dinosaur from the Jurassic discovered outside eastern Asia”, says Rauhut. The Haarlem specimen was found about 10 km to the northeast of the closest Archaeopteryx locality known (Scham haupten) in Jachenhausen a full four years before the discovery of the skeleton that would introduce the *Urvogel* to the scientific world in 1861. Scham haupten was once part of the so-called Solnhofen archipelago in southern Bavaria, the area from which all known specimens of the genus Archaeopteryx originated. Its taxonomic reassignment therefore provides new insights into the evolution of the bird-like dinosaurs “The group of dinosaurs that gave rise to birds originated in East Asia. As they expanded westward, they also reached the Solnhofen archipelago,” says Foth. Thus, the fossil hitherto incorrectly assigned to the genus Archaeopteryx must have been one of the first members of the group to arrive in Europe.

**In the beginning there was the sponge**

Which came first – the sponges or the comb jellies? The issue has become one of the most hotly debated problems in evolutionary biology. Several studies in recent years have come to discordant conclusions: Some have supported the conventional model, which favors the sponges, while others pointed to the comb jellies as being at the root of the animal kingdom. Researchers led by Professor Gert Wörheide (Chair of Palaeontology and Geobiology, LMU) and Professor Davide Pisani (Bristol University, UK) are now confident that the definitive answer is at hand. Sponges are comparatively simple multicellular organisms, which lack clearly defined tissues, such as muscles, and organs like the brain. Comb jellies are structurally much more complex and possess nerve and muscle cells. “If comb jellies were the oldest animal phylum we would have to reconsider our whole picture of the evolution of the organs and the nervous system”, Wörheide points out. “That’s why it is so important to correctly define the sequence of animal emergence early in evolution.” To elucidate the relationships between animal phyla, biologists construct family trees based on the degree of difference between functionally related DNA sequences. “Two datasets used in the modelling studies which identified the comb jellies as the oldest extant animal group were made up of very heterogeneous genetic data. We have now shown that none of the conventionally used statistical methods is capable of adequately analyzing such datasets,” Wörheide explains. The scientists used a refined method to re-examine the datasets employed in these investigations, and their results confirm the classical assumptions concerning early animal evolution: The sponges are in fact the oldest of the animal groups.
Bringing fuzzy edges into focus
by Simon Kirner

Like many experimental physicists Florian Schüder is a tinkerer. He is fascinated by the notion of one day being able to visualize the biochemical machines that carry out basic cellular processes at the level of single molecules. For the work described in insightLMU he received the CeNS Nano Innovation Award.

He has a Bachelor’s degree in Physics from LMU, did his Master’s thesis in Harvard, and is now engaged on a research project for his PhD, under the supervision of Professor Ralf Jungmann at LMU and the MPI for Biochemistry in Garching. But it’s now eight in the morning, and what Florian needs most is a cup of coffee. After all he was up until three, working on a new research paper. This will be the eighth journal article in his publication list, and the first as lead author – and he’s still in the first year of his PhD.

That makes him sound like a high-flier, but Florian (31), who comes from Kaufering, a small Bavarian town an hour west of Munich, only began his university studies after completing an apprenticeship as an electrician. “I could have gone on to become an electrical engineer. But I wanted to study physics, as the natural sciences were always my primary interest,” he says. It was undoubtedly the right decision. He was soon engrossed in experimental physics, and in Professor Jungmann – who was then a postdoc – he found an inspiring mentor. “The facilities and opportunities for DNA-based nanotechnological research in Munich are ideal, because several groups are working on diverse aspects of the field. And we all meet regularly to discuss and exchange ideas,” he explains. The idea for his Master’s project was conceived in the Emmy Noether Research Group led by Jungmann in LMU’s Faculty of Physics.

Tell us about the idea, Florian – what are you actually doing? “I tend to duck this question, because the idea is not that easy to explain,” he says. But then he begins anyway – in the 19th century, with Ernst Abbe, the German physicist who calculated from first principles the maximal resolution attainable with a light microscope of the sort used in his day. The limit was not surpassed for over a century. But the so-called diffraction barrier was eventually breached, and the limit was extended into the nanometer region.

Super-resolution microscopy for ‘crystal-crisp’ images

The physicists in Jungmann’s group are now working on further refinements of optical microscopy and developing light microscopes with entirely new capabilities.

His PhD thesis also deals with another innovative method for improving light microscopy. “This one is a bit more complicated,” he remarks, before setting out for the lab to do what he likes best – design and perform experiments.

DNA-based super-resolution method DNA-PAINT by combining it with the use of a confocal spinning-disk microscope. Super-resolution techniques can visualize single molecules labelled with fluorescent tags, but it is difficult to image the cell as a whole. By implementing the DNA-PAINT method on a spinning-disk microscope, it was possible – even without custom-designed hardware – to image whole cells with approximately 20-fold higher resolution than with conventional light microscopes.

www.softmatter.physik.lmu.de/personen/phd_students/florian-schuetter
LMU’s Veit Hornung among Leibniz Prize awardees

LMU immunologist Veit Hornung studies the workings of the innate immune system, the body’s first line of defense against pathogens – and has now received Germany’s most important prize for research. Veit Hornung investigates the mechanisms that enable the body’s innate immune system to distinguish between structures that are specific to invasive pathogens and molecules normally present in the infected cells. His research work contributes in particular to the development of therapeutic agents for the treatment of autoimmune diseases – and his name now appears among the winners of the Leibniz Prize 2018 announced by the Deutsche Forschungsgemeinschaft. Hornung receives the Prize together with Professor Eicke Latz of Bonn University, whose work likewise focuses on the innate immune system. The Leibniz Prize, worth up to 2.5 million euros, is regarded as the most important award for research excellence in Germany. The prize money can be used to support the awardee’s research for up to 7 years.

Five new ERC-funded projects at LMU

The European Research Council (ERC) has announced the award of four generously endowed Consolidator Grants, each of which is worth up to 2 million euros over period of 5 years, to researchers at LMU – Alexander Högele (Nanophotonics), Olaf Hohm (Theoretical Astrophysics and Cosmology), Konstantinos Panagiotou (Discrete Mathematics and Theoretical Computer Science) and Lode Pollet (Theoretical Nanophysics). Notably, both Alexander Högele and Lode Pollet have previously received ERC Starting Grants from the ERC. This corresponds to a success rate of 40% for LMU submissions, which is significantly higher than the overall figure of approximately 13% for this latest round of awards. Consolidator Grants are designed to enable excellent young talents to build on their past record for innovative research by providing generous long-term funding for ground-breaking projects in their respective fields. The winning projects are chosen solely on the basis of the scientific record of the applicant and the quality of the project proposed. www.lmu.de/erc-awards

US News Ranking: LMU best German contender on the list

In the 2018 Best Global Universities Rankings published by US News and World Report, LMU is the highest placed German university. The top three slots in the latest edition of the US News ranking, which comprises a total of 1,250 institutions in 74 countries, are filled by Harvard University, Massachusetts Institute of Technology and Stanford University. LMU is rated as the best university in Germany, taking 40th place in the list. The Best Global Universities Ranking is compiled by US News and World Report, and first appeared in 2014. It makes use of 13 performance indicators, including the individual institution’s reputation and the quality of the research produced. The latter parameter is based on the numbers of research publications generated and their citation records. www.usnews.com/education/best-global-universities

The student on the top step

Star of the last Winter Paralympics and, with a total of 20 World Championship medals is one of the most successful winter sportswomen ever. Now, Anna Schaffelhuber is Germany’s Disabled Sportswoman of the Year – for the fifth time. Anna (24) is studying to be a teacher – and she has been asked for her autograph during seminars. In spite of her fame, at LMU she remains focused on her studies. A native of Lower Bavaria, her unassuming and down-to-earth personality is unruffled and friendly, in spite of a packed schedule which makes “a student life” impossible. “Of course, that’s not always fun, and sometimes I really have to knuckle down to it. Because my sport is such a demanding one, I am in effect a full-time skier and a part-time student,” she says. Anna was born paralyzed from the waist down, and learned to ski when she was 5 years old – and has been a member of the German ski squad for the past 10 years. She is now in the middle of her preparations for the Paralympics in Pyeongchang in March, her next big challenge.

“Postcards” from afar: Simon Zitzmann, biology student, is one of the 1,000 LMU students who is currently abroad, thanks to Erasmus or the LMUexchange Program. More postcards from LMU students, are available here. www.lmu.de/erc-awards

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