



LUDWIG-
MAXIMILIANS-
UNIVERSITÄT
MÜNCHEN

insightLMU

The international edition of the LMU Munich newsletter

And the winner is – Goliath!

by Susanne Wedlich

Some animal species produce – at great energetic cost – sperm cells that are longer than the male organism itself. It is not known how old, in evolutionary terms, this phenomenon is. Using a newly developed high-tech approach, it has become possible to investigate the internal organs of exceptionally well preserved fossils. In cooperation with an international team of scientists, the palaeontologist Dr. Renate Matzke-Karasz recently succeeded in demonstrating that tiny ostracods (mussel shrimps) already used giant sperm for reproduction some 100 million years ago.



◀ *Ostracods are small aquatic mussel shrimps protected by a bivalved, calcified shell. This hard covering readily lends itself to fossilization. The most ancient specimens are found in rocks that are up to 450 million years old. This green freshwater species *Eucypris virens* prefers temporary pools.*

The Gene Center Munich at 25

Interview by C. Grosse and S. Wedlich

The Gene Center at LMU Munich was established 25 years ago. It has since developed into an internationally renowned institution for biomolecular research. In an interview with insightLMU, the Center's founding father Professor Ernst-Ludwig Winnacker and its present director Professor Patrick Cramer recalled some episodes in its highly successful history.

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From cortex to community

by Mike Gardner

A new Doctoral Training Program has been launched at the Munich Center of the Learning Sciences (MCLS). Doctoral students in the program enjoy intensive support. They also have good opportunities to engage in research in practical contexts. Starting out from real-life situations is one of the key features in the relatively new field of the Learning Sciences.

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For the complete article, see

www.en.lmu.de/news/insightlmu/2009/04_01.pdf

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The Gene Center Munich at 25

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Professor Winnacker, did you anticipate 25 years ago that the Gene Center would attain the stature it has since achieved?

Winnacker I hoped it would, but of course it wasn't possible to foresee that it would turn out that way. It was clear even then that advances in genetic research could only come from an interdisciplinary approach. And that meant getting chemistry, biology, medicine and veterinary science to work together. There were practically no laboratories in Germany that could provide such a research environment at the time.

Why was Munich selected as the site for the Center?

Winnacker With respect to gene research, the political decision-makers were under a great deal of pressure. That was why the Federal Government issued a call for proposals, and we submitted one in which all relevant research areas were included. The plan involved not only established investigators, but also promising younger scientists, and the latter contributed ideas that strengthened the overall strategy. We also secured the participation of the Max Planck Institutes early on. So, in effect, the whole range of expertise available in Munich was represented. The decisive factor was that our concept was interdisciplinary in character and utilized Munich's potential in a coherent fashion. In the end, Munich, Berlin, and Heidelberg were selected as sites for the new centers.

Were there political concerns to be overcome – in view of the Center's focus on genetic research?

Winnacker Indeed there were, and from the very beginning. During the planning phase I was actually under police protection, because I had received explicit threats and was even on the RAF's list of targets [Editor's note: The Red Army Faction was a band of left-wing extremists, who were responsible for a series of terrorist attacks in the Federal Republic in the period from 1970 to 1998]. But then we scientists initiated an intensive dialogue with the general public, which overcame many reservations. We also imposed restrictions on our research, which were later incorporated into the law governing the use of genetic technologies.

Professor Cramer, in the early days, the Center focus was on applied research. Today, basic research dominates the agenda. Why is this?

Cramer The story is often presented in that way, to make it easier to explain how the Center has developed. Actually, both basic and applied research continue to be carried out here. Our work provides a foundation for understanding disease, but it also supplies the basis for innovative biotechnological processes and their optimization. It is therefore not

easy to make a sharp distinction between basic research and applications. For example, thanks to know-how from the Gene Center, the amino acid cysteine can now be produced economically.

It is planned to construct a Center for Molecular Biosystems on the LMU's HighTechCampus. What will be the goal of that institution?

Cramer We want to understand how cells function and to identify their molecular components. The ultimate goal is to work out how proteins, nucleic acids and other elements interact, and how the entire system reacts to perturbations. To be useful, models of such systems cannot be purely hypothetical, but must be based on solid biochemical, molecular biological and genetic foundations.

Winnacker In my time, we were concerned with the isolation of single genes, but the challenge now is to define what makes our species human. To answer that question we will need to analyze many genes at once. We can now do that, and this makes such a perspective really exciting.

Looking forward, where do you see the Gene Center and genetic research in 25 years from now?

Cramer It is difficult to make predictions 25 years ahead. I imagine that by then we will, for example, be able to predict the primary actions and some of the side-effects of many drugs.

Winnacker In 25 years we will understand better how the functions of specific brain areas relate to cellular activity. Systems analysis will be more precise, and it will be possible to understand how individual cells behave. New insights often emerge in surprising areas. That is why it is so important to let young researchers get on with the job.



Ernst-Ludwig Winnacker is Professor of Biochemistry at LMU. In July 2009, he became Secretary-General of the International Human Frontier Science Program Organization. He had previously served for 2.5 years as Secretary-General of the European Research Council (ERC) in Brussels.



Professor Patrick Cramer has held the Chair of Biochemistry and the position of Director of the Gene Center since 2004. In 2006, he received the Leibniz-Preis, Germany's highest academic honor.

From cortex to community

(continued from page 1)

Sybille Langer is one of the first batch of students in the new Doctoral Training Program (DTP) at the MCLS, having graduated in psychology. "In my doctoral study I examine how to promote the scientific literacy of pupils at Munich upper secondary schools," she explains. "In nutshell, I asked them to have a look at a problem, formulate their own hypotheses and then test them, also using data from the Internet. An important issue here is how to properly integrate teachers into the process. I find the courses offered within the DTP most useful to sharpen my methodological skills in particular."

Julia Eberle is writing her doctoral thesis on promoting the formation of networks among general practitioners that will help them to exchange experience and insights to the good of patient care. "The notion of networking is also very important in the DTP itself," she says. "I can swap ideas with other doctoral students who happen to be in similar stages of their work, which is particularly helpful at the beginning. And interdisciplinary work in the Program keeps you from developing a tunnel vision of things."

Both students stress the importance of the agreements in the DTP on how the doctoral thesis is to progress, committing them and their supervisors to clearly formulated performance and structuring the process as a whole. Graduates from Teacher Training Colleges can take part, too. Mathematics teacher Yu-Pi Chang, from Taiwan, is exploring scope for the instructional support of pupils in developing an understanding of geometry. In all, there are 17 doctoral students, coming from seven countries and representing eight subjects.

The Learning Sciences emerged around 20 years ago, inspired by the insight that "abstract" studying of learning outside subjects and contents makes little sense. Rather, research should be in the context of one or several subjects. Networks and centers developed in the USA, focusing above all on combining research on the didactics of natural science and mathematics with pedagogical and psychological research on teaching and learning.

Research at the MCLS is based on a much broader approach summed up in the slogan "From Cortex to Community". Together with various cooperation partners such as "Technische Universität München" (TUM) and the Max Planck Institute of Psychiatry, the researchers at LMU have established the Learning Sciences in Munich as an interdisciplinary research field addressing the context, conditions and outcomes of

both successful and unsuccessful learning and adaptation processes. Options to access these aspects of learning and adaptation range from neuroscience research on cognitive adaptation processes to social research on knowledge processes. With this approach, the Learning Sciences have only been in existence at LMU since 2007. In 2008, the LMU Governing Board announced two new professorships to boost the field.

The 34 scientists working at the Center together with their research teams at LMU who represent eight disciplines address fundamental issues such as the cognitive mechanisms of adaptation or the link between emotion, motivation and cognition in the learning process as well as how conceptual knowledge develops and changes. Further aspects include acquiring insights on organizational conditions of learning or on collaborative learning processes in media-supported environments. Setting out from problems in educational practice, the researchers seek a solution via basic research in processes supported by a network of educational institutions such as schools and adult education centers.

"So far, research in the disciplines integrated in the Learning Sciences here has tended to be relatively isolated," says Professor Frank Fischer, MCLS Coordinator. "Take the wealth of results from the neurosciences in recent years, for example. Transfer to practical contexts has tended to be unsystematic, sometimes frivolous. One doesn't really know, for example, how intensive trainings targeted at memory performance affect much more complex learning, may it be in science education in school or in informal adult learning on the internet." Also, new insights often reach the responsible officials, teacher trainers and teachers themselves with a considerable delay, if at all. "We expect collaborative research and better-attuned Learning Sciences at the MCLS to help speed up knowledge transfer," Professor Fischer adds.

About doctoral studies at LMU Munich

Around 1,000 doctoral degrees are awarded in more than 100 subjects at LMU each year. Besides the traditional individual professorial supervision scheme, LMU is introducing an increasing number of international doctoral programs. In a new series, insightLMU describes the academic profile and various services of these programs and gives useful tips on application conditions and contacts.

For general information on doctoral studies at LMU, see www.graduatecenter.lmu.de

 RESEARCH


◀ In 1799, Elector Maximilian IV. appointed Maximilian von Montgelas minister of foreign affairs. It is, however, a lesser-known fact that Montgelas travelled to France as an extraordinary envoy in 1804.

HUMANITIES & CULTURAL STUDIES

Bavaria's foreign relations

by Marcus Simon

Bavaria has participated in diplomatic relations with the rest of Europe since the 16th century, and these contacts eventually gave rise to an astonishingly extensive international network. The historian Professor Ferdinand Kramer and his colleagues have been studying diverse aspects of Bavaria's external relations during the modern period. A new database being assembled by his staff now greatly facilitates the often arduous task of evaluating the relevant documentary material.

 For the complete article, see
www.en.lmu.de/news/insightlmu/2009/04_02.pdf



LAW, ECONOMICS AND SOCIAL SCIENCES

Little pests

by Susanne Wedlich

Bullies are school kids who make life hell for other kids using physical or psychological aggression. Developmental psychologist Dr. Mechthild Schäfer has conducted several studies that explain important characteristics and mechanisms of mobbing at schools and demonstrate what is typical for perpetrators and victims. She also tackles the question as to whether or not they remain in these roles throughout their schooldays.

 For the complete article, see
www.en.lmu.de/news/insightlmu/2009/04_03.pdf



◀ The bow-winged grasshopper has a so-called stridulating ridge on each of its hind legs, which they draw along the wing margin in a particular rhythm, giving rise to a scratchy, atonal sound.

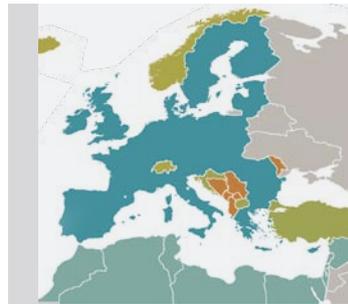
LIFE SCIENCES

Seeing in the dark, hearing rasps in the grass

by Jana Schlütter

There are only three ingredients for evolutionary success: find enough to eat, avoid being eaten and – above all – reproduce. In its restless search for ways to achieve these goals, evolution also acts to sharpen the discriminatory capacities of sensory organs. Two research groups at LMU Munich have now exposed some of the tricks exploited by different species for this purpose.

 For the complete article, see
www.en.lmu.de/news/insightlmu/2009/04_04.pdf



◀ The map depicts the deep organisational integration within Europe. Dark blue: the EU-27 states; light blue: Mediterranean Union; dark green: EFTA; light green: states in accession negotiations with the EU; yellow: CEFTA

INTERDISCIPLINARY INSIGHTS

Tracing global change

by Marcus Simon

For the past ten years researchers at LMU Munich have been engaged in intensive research on the fundamental social structural transformations which Western industrial societies are currently undergoing. The guiding question of their research was whether 21 societies can still be understood in terms of the concepts of the 19th and 20th centuries. The results of the Collaborative Research Centre "Reflexive Modernisation" are now available.

 For the complete article, see
www.en.lmu.de/news/insightlmu/2009/04_05.pdf

The Administrator-Artist

by Anja Burkel

Anyone who visits Willi Seitz at home may end up taking a seat on one of his early works. "I made the bench on which you're sitting," he says, adding modestly: "An older piece, but it's lasted rather well." Seitz, however, is not a carpenter. He is director of the Facilities Budgeting Unit in the Central Administration of LMU Munich – and, moreover, an artist. Currently he is exhibiting at LMU's University Gallery (UniGalerie^{LMU}), a forum for LMU students, staff, or alumni who have made a name for themselves as artists. Seitz's pseudonym is down-to-earth: officially "Willibald Seitz" at LMU, as an artist he prefers "Willi Ernst Seitz."

Now the 53-year-old is here in his Munich living room, recalling his artistic beginnings. He had already crafted several articles of wooden furniture for his home when he began to develop an interest in the pieces of wood he saw lying about on his walks. "Wherever I went with my wife and children: in the mountains, on the banks of the Isar – the south of Munich resembles a jungle in some places." His attention caught by "a distinctive form, an interesting texture," he began to work his finds. "I tried to leave the basic shape intact, yet highlight something – for example, a knothole which came to light." In addition he bought unusual stones and combined them with the wood. These are pieces which now fill his house and garden studio, pieces over which you long to run your hand again and again in order to feel the smooth surface or the cool stone. The objects from this period bear no titles pregnant with meaning, but instead are simply called "Driftwood/Amethyst" or "Ash/Malachite".

Seitz's studio is located in the backyard of his duplex. It resembles a workshop, with a handcrafted crib and rocking horse peeping out between the planks of wood which are neatly lined up at the rear. Chisel, hammer, pliers, wooden mallet, axe, and handsaw are some of Seitz's tools. "I split, hack, cut – whatever suits me." Even the chainsaw gets its turn – for instance, to slash a lightning bolt into a spruce board.

At some point, however, merely combining wood and stone wore thin. Seitz began to enhance the wood with paint. He brought home old pallet legs from the University administration's print shop, cut pieces out, chipped small wedges, from



▲ Willi Ernst Seitz

▼ "Tuition Fee", wood carving



which he constructed large panels. "It was very interesting to pour paint over them. Of course it flowed over the picture, producing an irregular and at the same time regular effect."

Working with wood is more than a hobby for Seitz. "I consider myself an artist and take it very seriously." He also approaches his exhibitions professionally – in the past, among others, in a Munich art gallery or in the rooms of the Bavarian State Ministry of the Environment and Public Health. "Structural Change" in the UniGalerie^{LMU} is his current show. Willi Seitz attaches great importance to the way in which his art is displayed. "People should move from object to object – and marvel!"

How is art compatible with working in the LMU administration? "If anything, it's the creative process which has an influence on my administrative work. It gives me more calm and composure." In general he keeps his nine-to-five duties and art strictly separate. However, a piece on exhibit in the UniGalerie^{LMU} alludes to his day job: He entitled an open hand carved in wood "Tuition Fee". After all, at work he is in charge of allocating the tuition fees which have also been levied for several semesters at LMU. "I'm smack in the middle of the money free-for-all." Appropriately, he set 500 euros as price for the piece – what most LMU students too have to pay each semester.



An "UniGalerie^{LMU}-Podcast" about Willi Ernst Seitz's exhibition at the UniGalerie^{LMU} can be found at www.itunes.lmu.de. Further information and photos of his work are available at www.willi-seitz.de.


IN SHORT

LMU Munich still ranks as best German university

In the 2009 Academic Ranking of World Universities (ARWU) of Jiao Tong University in Shanghai LMU Munich maintains its top position among German universities. Like last year, it ranks 55th in this list of the world's 100 best universities. The highest-ranking discipline at LMU is physics, which comes 25th worldwide. LMU president Professor Bernd Huber above all sees this result as an incentive to even further boost LMU's international position: "This result once again reveals LMU's unchallenged position in Germany, but from an international angle, there is still room for improvement." He also says one must always consider the method of ranking. Overall, the Shanghai ranking is independent and long-term. "In the long run, however, we need a ranking system that applies to European scientific standards. As Chairman of the League of European Research Universities, I shall be campaigning for such a system."

 For more information, see:
www.arwu.org/arwu2009.jsp

LMU radiologist elected to the US National Academies

Professor Maximilian Reiser, Director of the Institute of Clinical Radiology at the LMU Munich Medical Center, is one of five foreign associates to have recently been elected to the US Institute of Medicine of the National Academies. This is in recognition of the outstanding scientific achievements of the renowned medical scientist, who is currently dean of the LMU Faculty of Medicine. Each year, the Institute of Medicine elects around 65 members from the USA and up to five foreign associates who have made major contributions to the advancement of the medical sciences. The Institute of Medicine is an organization belonging to the National Academies, a body signed into being by US President Abraham Lincoln in 1863 that advises the United States of America on all matters of science.

Imprint

Published by the Executive Board of
Ludwig-Maximilians-Universitaet (LMU) Muenchen
Editing: LMU Munich Communications & Media Relations
Layout: [www.haak-nakat.de]

MISU already busy preparing for Summer 2010

Munich International Summer University (MISU) is already planning for next summer: During July and August 2010, students from all over the world will have a chance to study and live in one of Europe's leading research universities on programs lasting from two to eight weeks. The programs cover a wide range of academic subjects, from European Politics, German and European Law to Medicine, Biology and Nanoscience as well as Electronic Media and Literature. Participating students will have the unique opportunity to expand their academic knowledge and gain extra credit while experiencing German and European culture through travel and program excursions. For all those interested MISU also offers German courses for all learning levels.

 For further information and application details, see
www.lmu.de/international/misu

South American wins DAAD Prize

"I really think pigs are very cute," says Rose-Leah Austin Busse with a smile. "I know they are smelly, but then we all have our faults!" The 29-year-old from Guyana in South America has been awarded the DAAD Prize (German Academic Exchange Service) for extraordinary academic and social commitment. A doctoral student at the Faculty of Veterinary Medicine, she is now engaged in research on swine diseases. Austin Busse studied biology at Southern Arkansas University in the US. She then moved to Munich, where she obtained a degree in veterinary medicine. It was during this time that pigs began to spark her interest. She devotes much of her free time to voluntary work for two organizations dedicated to the prevention of cruelty to animals and the promotion of animal welfare. The DAAD Prize is awarded at LMU Munich every year and is worth 1,000 Euros.

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