Human evolution and its future
By Martin Thurau

Whither human evolution? Who were our ancestors, where did they come from and how did we as a species acquire language? In the following interview, anthropologist Gisela Grupe and population geneticist Wolfgang Stephan highlight crucial stages in the evolution of our species Homo sapiens.
For the complete article, see www.en.lmu.de/news/insightlmu/2015/01_01.pdf

An early sign of the superiority of Homo sapiens? In Gisela Grupe’s view, the significance of cave paintings like those in Lascaux in France has been “overemphasized” in comparisons with the cultural accomplishments of Neanderthals.

Doryphoros on tour
by Simon Kirner

Standing in the same position for so long is no fun. Doryphoros needs a break. In response to a flattering invitation, LMU’s Spear-Bearer is now serving as an Ambassador for Classical Greek Art in London.
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REASON’s search for scientific reasoning
by Elizabeth Willoughby

What constitutes scientific reasoning? How does it develop? How can it be used in different academic domains? Scientific reasoning experts and PhDs from around the world searched for answers to such questions at the first Spring School of REASON, an international doctoral program at LMU.
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Sparked, structured and set in motion from university
by Elizabeth Willoughby

When LMU alumnus Felix Klühr thinks back to high school in Aschaffenburg, Germany, he had no inkling that in a few years he would cofound a startup and be orchestrating a team that creates mobile study material for university students across Europe.
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Doryphoros on tour
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Choosing to reject a courteous request from Prada is not a decision that is taken lightly, especially when one is being asked to open the Fondazione Prada’s new art gallery in Milan. Indeed, the response would have been prompt and positive – were it not for the fact that an e-mail had arrived in Professor Rolf Michael Schneider’s mailbox a short time before. Addressed to the LMU archaeologist, Ian Jenkins, Senior Curator in the Department of Greek and Roman Antiquities at the British Museum in London, politely enquired whether LMU would be willing to lend its Spear-Bearer for an exhibition entitled Defining Beauty – The Body in Ancient Greek Art, which opened in March 2015. “For the first time, our bronze reconstruction is at the center of an exhibition – in the British Museum – and will stimulate renewed critical discussion. That’s what set the project in motion in the spring of 2014,” says Schneider, who taught at Cambridge University for several years.

Copies as pointers to the original

Polyklet’s original work, as faithfully as possible, on the basis of existing Roman copies – a method pioneered by Adolf Furtwängler in the 19th century, which is still in use today. Furtwängler was Professor of Classical Archaeology at LMU between 1894 and 1907. “Those years were an exciting period for my academic forerunners,” says Schneider. “At that time, it was widely believed that lost original works of art from the Classical Age could be reconstructed. Of course, the idea of viewing antique copies as guides to the originals was, and still is, helpful. But in the end it teaches us more about the Roman copies themselves than it does about their lost Greek archetypes.”

A chequered history

“Even today, the figure of the Spear-Bearer retains a considerable measure of cultural significance for LMU,” says Schneider. “Its most interesting aspect lies in the transformations that have occurred in how the figure is perceived.” Over the past 100 years or so, it has been part of an era that could hardly have been more turbulent. Doryphoros’ biography began with Adolf Furtwängler’s researches, carried out in the intellectual atmosphere of LMU towards the end of the 19th century. In 1921, it found itself in a very different world, serving as the focal point of a monument to the LMU academics and students who lost their lives in the First World War. That memorial was located in the very heart of the Main Building. “This illustrates how susceptible to misuse such a figure can become when it is detached from its original context,” says Schneider. “Then the Nazis appeared on the scene, although they had little use for the piece.” And when the central section of the Main Building was destroyed in 1944, the Spear-Bearer miraculously survived. He survived, but not entirely unscathed, having lost his lower legs, his eyes – and his spear. He was returned to his original position only in the mid-1950s, and has taken on several new identities since then. He now appears unarmed, and constitutes the sculptural centerpiece of the Main Building. So his absence, while engaged in embodying a particularly ambitious attempt to reimagine a lost masterpiece of Classical Greek art for visitors to the British Museum’s exhibition (which runs until 5 July), can hardly go unnoticed. “He is a focal element in the exhibition, with an original sculpture from the Western Pediment of the Parthenon by his side,” says Schneider. As soon as he returns from his stay in London, Doryphoros will give us an account of his journey, which will appear in MUM (the Münchner UniMagazin) and online. Then he will resume his customary station in the Main Building as a silent observer of the comings and goings at LMU. Translation: Paul Hardy

Central to the projects of all REASON PhD students is being able to measure scientific reasoning. Thus, this was the theme for last month’s REASON Spring School, where 45 PhD students from Asia, the US and Europe were invited to Munich for three days to share research, refine measuring methodologies, and participate in workshops offered by professors that are internationally renowned for their work on scientific reasoning and argumentation.

Andras Csanadi, a Hungarian PhD student in his second year at the REASON study program, found the event particularly valuable to his research, which is a study on how student teachers engage in scientific reasoning in their everyday practice, and how it can be fostered. “We received a lot of feedback on our research at the conference, which definitely contributes to a better quality of our theses,” he says. “An international environment also inspires one to think out of the box.” As well, the event provided the opportunity for students to create new contacts, including with experts whose work they may have read but whom they’d never met before.

The graduate study program

REASON falls under the Munich Center of the Learning Sciences (MCLS) and is funded by the Elite Network of Bavaria. Under the direction of Prof. Frank Fischer and coordinator Dr. Marcus Bozer, in English language instruction, 12 professors from Munich’s LMU, Technical University and Catholic University of Applied Sciences, who work in different areas of scientific reasoning, support 20 doctoral students via supervisory meetings, plenary discussions and presentations, and informal meetings to discuss things like defining scientific reasoning, its development and implementation. What role does emotion play? How do children process scientific evidence, and how do medical students compared to math students? How do search engines, social media, and other technologies change scientific reasoning and argumentation?

Spring School success

Besides understanding what makes specific domains different, the overarching aim is to find commonalities between them. If a teacher who is helping a student with learning difficulties doesn’t use her psychology training, such as motivational theories and memory models, then the child’s real problem will not be adequately addressed or resolved. But what if the teacher’s education curricula had included more effective support for scientific reasoning?

Says Andras, “Working in an interdisciplinary team helps to keep your mind open by taking you out of your specialization. What I also really like is that we are constantly developing not only our work but our way that we deal with problems and with each other.”

REASON PhD student Maryam Alqassab from Bahrain, one of the organizers of the Spring School, says the interdisciplinary aspect and expert feedback of the study program is a PhD student’s dream, but the Spring School was particularly rewarding. “I wanted to be part of the organization committee because I felt it would be a great opportunity to cooperate with so many different people. We had to make sure PhD students from around the world would attend. We had to recruit acknowledged professors and experts in scientific reasoning. We had to collaborate with peers and professors to be sure that the conference would be a useful and rich learning experience for all participants, who were coming from many different fields but all sharing the same research interest.”

“We met all our goals for the conference,” says Andras, “and students found the feedback, workshops and keynote presentations very helpful. What really surprised me, though, was the number of common aspects that exist between the different topics and my own research. For me it was a great collaboration.”

www.en.mcls.lmu.de/study_programs/reason/
**Geobiology**

**Animal roots and branches**

By Martin Thurau

Sponges are one of the most ancient of all extant animal lineages. LMU geobiologist Gert Wörheide studies the group to learn about early animal evolution and how new species evolve.

For the complete article, see [www.en.lmu.de/news/insightlmu/2015/01_02.pdf](http://www.en.lmu.de/news/insightlmu/2015/01_02.pdf)

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**Cosmology**

**Late news from the Big Bang**

What exactly happened after the Universe was born? Why did stars, planets and huge galaxies form? These are the questions that concern Viacheslav Mukhanov, who models the first instants after the creation of our Universe and tries to find the answers with the help of mathematical physics. Mukhanov, Professor of Physics at LMU, is an acknowledged expert in the field of Theoretical Cosmology. He has used the notion of so-called quantum fluctuations to construct a theory that provides a precise picture of the crucial initial phase of the evolution of our Universe: For without the minimal variations in energy density that result from the tiny but unavoidable quantum fluctuations, one cannot account for the formation of stars, planets and galaxies that characterize the Universe we observe today. The Planck Consortium has now published new analyses of data returned by the eponymous space telescope. The data have now confirmed beyond any reasonable doubt Mukhanov’s theory of the quantum origin of structure in the Universe. The telescope on board of the Planck satellite has measured the distribution of the cosmic microwave background radiation, which, in essence, tells us what the Universe looked like about 400,000 years after the Big Bang. These latest findings are in complete agreement with the predictions of Mukhanov’s theory – for example, his calculation of the value of the so-called spectral index of the initial inhomogeneities. As Jean-Loup Puget, Principal Investigator for the HFI-instrument on the Planck satellite, stated: “The Planck data confirm the basic predictions that quantum fluctuations are at the origin of all structures in the Universe.” Mukhanov, who first published his model in 1981 and joined the Physics Faculty at LMU in 1997, says “I couldn’t hope for a better verification of my theory.”

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**Pharmacology**

**Trapping the Ebola virus in transit**

How the Ebola virus infects host cells and exploits their metabolism for the production of new virus particles is not fully understood. Research groups led by pharmacologists Martin Biel and Christian Wahl at LMU, and virologist Dr. Robert Davey at the Texas Biomedical Research Institute have now supplied one of the missing pieces of the puzzle – and uncovered a new target for therapeutic drugs. The Ebola virus infects macrophages by latching onto specific receptor molecules found on their surfaces. Receptor binding causes the cell membrane to fold inwards like a pouch which is then pinched off, engulfing the receptors and the attached viruses in endocytic vesicles. These “endosomes” then fuse with another type of vesicles called lyso-somes. Specific ion-channel proteins in the lysosomal membrane, known as two-pore channels (TPCs), are known to play an important role in the fusion process. Biel and his team have now shown that TPCs are essential for the establishment of an Ebola infection: Upon binding of an endosome, the TPCs release a stream of calcium ions into the cytoplasm that serves as a signal for membrane fusion, which is required to ensure that Ebola infection cycle can proceed. If the TPCs are genetically defective or functionally inhibited, the viruses remain trapped in the endosomes, effectively aborting the infection. The researchers also found that tetrandrine, an alkaloid derived from plants used in traditional Chinese medicine, effectively inhibits infection of isolated macrophages by the Ebola virus. Biel and his colleagues took a closer look at the interaction between tetrandrine and TPCs and analyzed its effect on their function. Martin Biel believes that targeting the TPCs represents a promising strategy. “Instead of trying to kill the virus, we simply ensure that it is no longer infectious”. 
Playing soccer for balance and cooking to relax, Felix was unsure of what profession he eventually wanted, so he postponed university to work, travel and gain some experience. After completing an internship in New York city evaluating the profitability of airline routes, and working in a hotel in Tenerife, Canary Islands, he found himself highly motivated to get on with his studies. Felix decided to take business administration at LMU because of the university’s excellent reputation and location, and describes his four years there as the perfect combination of freedom, social interaction and academic education.

“Studying at university is the greatest time in life,” says Felix. “It is a period of freedom from responsibilities that you will probably never experience again, which allows you to do and to learn so much, and it’s those moments and relationships that shape your personality.”

The spark

LMU is also where he and two fellow students got a big idea. In their third semester, Felix, Korbinian Weisser and Jonas Hoffmann developed their own study materials to prepare for upcoming exams, which were increasingly being given in a multiple choice format. Rather than paying for expensive tutors or using the existing summarized study material, the three created a pool of questions taken from tailored materials to study. Their successful exam results were noticed by other students, who began to pressure them to share their methods and material. Influenced by his course on business planning and with input from his macroeconomics Professor Flaig, Felix brainstormed with his two peers about the best way to distribute the study materials among the students as a complimentary tool to exam preparation. After some failed attempts, they decided that a mobile app would be the best way. It would also allow students to study wherever and whenever they wanted to.

Groundwork for growth

Unlike in some universities where students lose grades for missing classes, in business administration at LMU there is a three-week study period followed by all the exams, twice a year. “Other than those six weeks,” says Felix, “that gives you so much freedom in the way you allocate your time. If you manage your studies properly, you can work, you can have a side project, you can do whatever you want.”

Thus began Felix and his partners’ steep learning curve of the development of a startup and mobile app that would give practice questions created by top students (called tutors) for specific course studies. They called it qLearning – q for quick. The startup not only provided a way for them to stand out from the other 800 plus LMU business students, but the external validation would also be important for future professional prospects.

The big breakthrough near the end of their studies came from Hub:raum, the incubator of Deutsche Telekom (DTAG), who invited Felix and his partners to move into their newly built offices in Berlin with full support for a year. They also offered the initial seed funding to develop the app. It didn’t take them long to accept the offer.

18 months later, qLearning now has 275 tutors at 100 universities across Europe, and in 2014, 60,000 students were using the app for exam preparation, but Felix wants to take it further. He wants to see it used by university students across the globe, as well as by professors to provide a more blended learning experience, and to contribute to the content. It is catching on, even outside of Europe – a professor at Queens School of Business in Kingston, Ontario in Canada has started to use qLearning as a teaching tool.

“I love ideas,” says Felix. “I love the execution of ideas. I want to get things done.”

https://www.qlearning.de
In Short

LMU again most renowned German university

The Times Higher Education World Reputation Rankings 2015 place LMU Munich in 35th slot overall, making it again the best performer among the German universities listed. LMU has improved its position by 11 places over the course of the past year, and is again ranked among the top ten in Europe. As part of the survey on which the Times Higher Education World Reputation Rankings 2015 are based, the THE, in cooperation with scientific publisher Elsevier, last year asked renowned academics in all fields to name the universities they regarded as the best in their own particular discipline. Some 10,500 respondents in 142 countries contributed to the exercise. www.thewur.com

LMU joins the Europaeum consortium

LMU is now a member of the Europaeum, an association of 11 leading European universities founded in 1992 with the intention of promoting excellence in research and teaching, specifically in the field of European Studies. The Europaeum counts Oxford University, the Université Paris – Panthéon-Sorbonne, the Universidad Complutense de Madrid and Charles University in Prague among its members. LMU is currently the only German university in the network. The Europaeum’s activities include organizing collaborative courses, summer schools and Master’s programmes, arranging interdisciplinary conferences and workshops, facilitating research visits, and opening fellowship schemes and mobility programs to applicants from the partner universities. The Europaeum’s major research focus is on the field of European Studies, and its primary goal is to develop a pool of talents – a group of gifted scholars who will carry out collaborative investigations of specifically European topics. In addition, the Europaeum seeks to promote cooperation between its member institutions, to stimulate dialog between academic researchers and the spheres of politics, commerce, the media and culture, and to train future European political and business leaders. www.europaeum.org

Seven ERC Grants for up-and-coming researchers from LMU

In the latest call for proposals for Starting Independent Researcher Grants issued by the European Research Council (ERC), submissions from LMU researchers have won six of the generously endowed awards, more than any other university in Germany. Moreover, a LMU physicist has obtained an ERC Consolidator Grant, worth 2 million euros. ERC Starting Grants aim to support up-and-coming researchers from all over the world who are about to establish or consolidate a proper research team and to start conducting independent research in Europe, whereas the Council’s Consolidator Grants enable gifted young scientists who have already published innovative work to extend their investigations further. ERC grants are awarded solely on the basis of the scientific excellence of the researcher and the research proposal. The LMU Starting Grant awardees in this latest round are: Dr. Martin Saxer (Faculty of Cultural Studies), Dr. Christoph Scheiermann (Faculty of Medicine), Dr. Alexander Fraser (Faculty of Languages and Literatures), Dr. Franz Herzog (Faculty of Chemistry and Pharmacy) and Prof. Bernadett Weinzierl (Faculty of Physics). Philosopher Dr. Barbara Osimani is moving to LMU, and will carry out her ERC project at the Munich Center for Mathematical Philosophy. The ERC has awarded a Consolidator Grants to LMU physicist Dr. Peter Baum.

New doctoral program in environmental humanities

The social repercussions of climate change and loss of biodiversity, the domination and destruction of natural resources and habitats as well as problems of environmental justice: these are among the topics dealt with in the new doctoral program designed by LMU’s Rachel Carson Center – in collaboration with the University of Leeds (UK) and the Environmental Humanities Lab at the Royal Institute of Technology in Stockholm. The network will give suitably qualified graduate students the opportunity to become intimately acquainted with all facets of the environmental humanities. The project “Environmental Humanities for a Concerned Europe” (ENHANCE for short) is the first distinctively transnational and multidisciplinary educational and research endeavor of its kind in this area. The program is made possible by a € 3 million grant from the European Commission’s Marie Curie Actions Initiative. These European-funded positions begin 1 October 2015. The deadline for applications for the LMU Munich positions is 15 Mai 2015. www.carsoncenter.lmu.de/study/enhance

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