dies academicus

Heads, Hearts and Emotions

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speech made by President
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Heads, Hearts and Emotions

Ladies and gentlemen,
Respected guests,
dear friends of TUM!

Georg Friedrich Handel was a prolific composer. In 1739, a particularly industrious year, he wrote 12 concerti grossi, as many publications as a diligent TUM professor produces in a year. Unfortunately, neither Handel nor Mozart, whose "Exsultate, jubilate" will be closing today's ceremonies, have a personal connection to our university. However, even though we don't have a direct link, Mozart's work will be played by the Munich Symphonic Ensemble, conducted by Felix Mayer. We firmly believe in supporting young musicians, the majority of whom are TUM students. Not only because they enhance the artistic culture at our university. But also in recognition of their willingness to journey beyond the world of measurements, weights, numbers and figures, bringing joy to themselves and us as listeners. And on a more scientific note, music has even been proven to comprehensively stimulate neuronal activity.

The motto of my speech last year was "Every talent counts". This year, I will be focusing on "Heads, Hearts and Emotions". I'll be introducing many great minds who inspire and share our ideals and beliefs. And this includes everyone here, ladies and gentlemen; each of you have been faithful companions over the years, always ready with suggestions, criticisms, warnings and encouragement, and always with our best interest at heart. Yet instead of welcoming each of you individually, as would be appropriate, I would like to express my deep gratitude to our dear departed friend, honorary senator and member of the advisory committee, Dr. Paul Wilhelm, whose funeral took place yesterday. Without his efforts, the reforms we implemented over the last ten years would never have been founded in the Bavarian University Law. He truly deserves our greatest respect and thanks.

Many people are passionately committed to TUM, strengthening the emotional ties that unify the academic community. However, it is never possible to mention all those who really deserve it. The individuals I mention tonight are merely representative of the valuable contributions to our university throughout the year.

It is my great pleasure to welcome our guest speaker Ján Figel', European Commissioner. He is in charge of Education, Training, Culture and Youth. I would also like to extend a warm welcome to our guests of honor, Dr. Eberhard von Kuenheim, since Monday bearer of TUM's Ring of Honor, and Dr. Horst Nasko, our new Honorary TUM Citizen.

Unfortunately, there is not enough time for me to go into our academic year's scientific breakthroughs in detail – even though many of them have created great waves in the scientific community. Highlights ranged from salt-tolerant wheat capable of growing in the desert, to the first ever identification of a physical constant in protein folding, enabling scientists to start understanding and predicting the structure and stability of proteins. Not forgetting the first real-time neutron tomography of a rat lung at the neutron source in Garching, which has given new insights for the treatment of patients with acute pulmonary failure.

TUM² – TUM squared

"TUM squared" is an innovative initiative, bringing together past and present students. Within the framework of this project, TUM alumni act as personal mentors for students, providing support and advice throughout their studies. The new mentoring project, the brainchild of a group of TUM students, is financed from StudiTUM funds, as part of our quality initiative and administered by TUM's Alumni & Career Service. I sincerely hope that TUM² helps turn today's committed students into tomorrow's supportive alumni.

New vice presidents

We can now boast three new vice presidents, all of whom significantly bring down the Board's average age! Geodesist Liqiu Meng has been appointed vice president responsible for international relations.

Engineer Kai Wülbern is our new Chief Information Officer, and as such is responsible for all IT issues at the university. He successfully masterminded the implementation of our electronic matriculation system TUMonline in spring of this year, making TUM the first German university to deploy a system of this kind in combination with an aptitude test. We were then able to use this system to process over eighteen thousand applications.

Mathematician Peter Gritzmann has taken on responsibility for education and teaching. Considering the rise in cross-faculty courses, this is an increasingly important area at TUM. We are now facing a new challenge that forces us to take a closer look at effective teaching skills and determine how successful models can be improved, assessed and appropriately rewarded. Until now, these are issues that the academic community nationwide has been only too keen to avoid. But we want to find answers. After all, an excellent university is a lot more than the sum of excellent research and excellent tuition.

Scientific accolades and the "brain gain"

TUM certainly received its share of scientific awards over the course of the academic year. I have restricted myself to the most prestigious accolades.

Burkhard Rost is living proof that the brain gain also works from the USA to Germany. We fought a hard battle with Columbia University (New York) for the leading player in modern bioinformatics. But it was one that paid off. Now Burkhard Rost is coming to Munich to head his own department at TUM. He will be accompanied by his wife, Karima Djabali, who will be starting as a tenure track professor at the TUM Clinic for Dermatology and Allergology. This double coup was aided by the Alexander von Humboldt-Foundation in the form of a five million Euro Humboldt professorship – one of the first of its kind – that the foundation awarded. Building on our core competencies in this field, Burkhard's skills will make us a world leader in bioinformatics for some time to come. Our success in gaining this prestigious husband-and-wife team also reflects the success of our "double career policy" – a project we are developing within the framework of the German Government's Excellence Initiative.

Another new addition to our university, Vasilis Ntziachristos, formerly of Harvard Medical School, has been awarded one of the first EU Advanced Investigator Grants by the European Research Council. Both we and the HelmholtzZentrum München are delighted at this 2.5 million Euro award. Originally from Greece, Vasilis Ntziachristos developed optoacoustic tomography, a methodologically most innovative imaging technology designed for use in the field of medicine. This approach also represents an outstanding interdisciplinary achievement.

Manfred Boy was awarded the Konrad Zuse Medal, the highest distinction for computer science in the German-speaking world.

The Global Award for Sustainable Architecture went to Hermann Kaufmann in recognition of his work in timber construction, described as being characterized by "the smooth interplay between creativity, design, technology and ecology".

Information about further awards and distinctions can be found in our university magazine TUMCampus. Redesigned at the beginning of 2008, this publication provides regular reports on all aspects of university life.

Brain gain is a form of headhunting. We target up-and-coming high flyers, whether Indians from Singapore or Italians from Milan. We also try our best to keep other talented individuals from moving to the ETH in Zurich, which as you can imagine involves a certain amount of persuasion. Attracting big names is crucial for establishing new centers of research. Key examples of recent wins in this area are Klaus Mainzer, the head of the Carl von Linde Academy is a renowned expert in his field; our renewable resources program is headed by Volker Siebert, a chemist with outstanding international and industrial experience. Darmstadt University must now do without Claudia Eckert, who is now helping create a new Fraunhofer Institute in Garching. The byword in all these cases is competition – either solo or through alliances.

Internationalization

Any university looking to align itself with the highest international standards needs strategic alliances. The European University Alliance in Science and Engineering is a case in point. We originally established this program together with the Technical University of Denmark (DTU). It has now been expanded to include the University of Technology in Eindhoven, home of multinational company Phillips. This "five star" alliance will soon be complete, enabling us to strengthen our influence in Europe in areas where alone, even a university such as ours is too small to make a real impact. One of the first aims of this initiative is to create a research-based graduate program in energy technology.

Unexpected developments, previously unheard of in the global scientific community, have led us to take a historical step on the Arabian Peninsula. The Abu Dhabi – Munich Research Alliance will facilitate the transfer of chemical and application know-how between TUM and the Petroleum Institute of the Abu Dhabi National Oil Company.

Our alliance with the Saudi-Arabian King Abdullah University of Science and Technology (KAUST) is a high-level initiative of key strategic importance. Within just two years, an entire scientific campus is being built on a 3,600 hectares site on the shores of the Red Sea, close to the city of Jeddah. Over two billion US dollars will have been invested by the time the university is officially opened on September 5, 2009. 34 thousand construction workers are currently involved in the building project. This research university is being built in close cooperation with the world's largest oil company, Saudi Aramco. The university's offering is not organized by traditional departments, but by future-oriented topics such as resources, energy, environment (bioscience, engineering and materials science), applied mathematics and computer science. And just like our university, KAUST is also thinking ahead of its time and beyond the depletion of fossil fuels by adding biogenic renewable resources to its topics.

Certain alliances are always seen as clever, strategic moves. These include cooperations with leading institutions such as the University of California in Berkeley, Stanford University, the University of Texas in Austin, MIT in Boston, plus the Imperial Colleges in London, Cambridge and Singapore. And TUM is also part of this list and the only university in this league in Germany. To ensure the very best education experience, we settle for nothing short of the best minds when we recruit our staff, professors, junior scientists and even students. Anyone experiencing this dynamic process first hand can certainly draw parallels with the dramatic changes that took place in Germany during the "Gründerzeit" period of the 19th century. At the groundbreaking ceremony for KAUST in 2007, King Abdullah made a convincing case for his vision by stating: "There are no limitations by space and resources, but there are limitations by talents" – almost the opposite to the situation we have here. He continued by saying that "knowledge is the oil of the future." And that certainly means something, coming from the one person who, certainly for the near future, has the world's most extensive crude oil reserves available.

Yesterday, we cemented our reputation as a leading academic light in Germany by signing a cooperation agreement worth around 21 million US dollars. I would like to personally welcome the representatives from Saudi Arabia, His Excellency Al Naimi, Minister of Petroleum and Mineral Resources, KAUST Chancellor Nadhmi Al-Nasr and President Professor Shih, who I already count as a good friend from his time at the National University of Singapore.

This alliance, ladies and gentlemen, represents much more than scientific excellence. Our bond with KAUST and the Arabian Peninsula can help bring cultures closer together, something that science has always achieved – usually ahead of politics. Prime examples here are the unification of Europe after a century of conflict, or the fall of the iron curtain and the reunification of Germany. Not to mention the bridges that have been built in the name of science between Europe and Asia or the Indian Subcontinent. Now, more than ever, we must acknowledge that dialog between the world's major religions is the key to ensuring cooperation and harmony within a global community in which national boundaries are becoming increasingly blurred. For the vast majority of the world's population, Christianity, Islam, Judaism, Buddhism and Hinduism are the main cultural reference points, influencing people's day-to-day life and outlook. As open-minded scientists with a Western cultural background, I believe we have a duty to make a valuable contribution here.

Our new faculty: The TUM School of Education

40 years have gone by since we started training teachers at TUM. As is generally the case with new developments, this program was initially tolerated rather than actively embraced. But now we have created our newest, 13th faculty, the TUM School of Education. The department is dedicated to education studies and teacher training. This move forward reflects our willingness to do more than just talk about the central importance of highly trained teaching staff, it also shows that we walk the talk. Just last week, TUM's Board of Trustees (Hochschulrat) resolved that the new faculty will be responsible for coordinating and modernizing the teacher training courses in the areas of mathematics and natural sciences. This will be flanked by new activities, to be set up by six new faculty positions financed through generous donations.

This faculty is the logical result of numerous individual measures that have made us increasingly aware of our duty to provide the best possible training for future teachers. These measures include existing partnerships with over 150 high-schools (30 of which have been recognized as "TUM model schools") that provide the students with practical experience right from day one (TUMPaedagogicum), a two-phase bachelor/master course in teaching natural sciences (Naturwissenschaftliche Bildung), TUMLab a teacher/student lab at the Deutsches Museum in Munich, the University/High-school forum, new dedicated educational methodologies, and the TUM Corporate Center for Teacher Training (Zentralinstitut für Lehrerbildung und Lehrerfortbildung). We have certainly been preparing the groundwork for this move for quite some time! So although it may come as a surprise to some, it seems a logical step for this technical university to create a School of Education with faculty status. Renowned educational researcher Professor Manfred Prenzel – whom you may know as the "German Mr. Pisa" – has agreed to become first dean of the faculty.

The new faculty is driven by our recognition of how educational quality impacts both society's intellectual culture and economic prosperity. It therefore makes good sense to not just passively demand improvements in teacher training, but also to take active steps to raise the bar in this area. Teacher training should not be pushed to the margins of university life, but must be given the central role it deserves. We choose to lead by example here.

In 1964, educationalist and religious philosopher Georg Picht brought the idea of a "German Educational Catastrophe" ("Deutsche Bildungskatastrophe") into the public eye. Picht was concerned that the skills of a young, rising population were not being properly developed. Now a lot more is at stake, and we must focus on quality rather than quantity. If the current birth rate in Germany stays the same, the population is set to shrink by almost 18 million over the next 30 years despite increasing life expectancy – in other words by more than a fifth of the current figure. If we fail to provide an excellent educational environment to nurture young talent at all levels, we will be facing a "Demographic Educational Catastrophe". As a result of our aging society, underfunded schools and universities plus international competition on free markets, we now find ourselves in a difficult situation. The only real solution is a multi-billion-euro educational program, which must be given priority over all other issues. Only by tackling this problem now can we hope to avoid such a catastrophe.

The TUM School of Education therefore represents our commitment to this cause, and also sends a signal to the German education community. If we do not ensure that today's trainee teachers are capable of embracing progress in the natural sciences at an intellectual and emotional level, we risk losing tomorrow's engineers and subsequently that great seal of approval "Made in Germany". We are confident enough to lead by example and help shape and drive a nationwide education initiative. The huge interest from sponsors that our new faculty has generated is confirmation of this – after all, this new school requires extra funding to the tune of 2.5 million euros per year. I would like to thank everyone who, like myself, has persevered with this seemingly unusual, yet truly crucial project for TUM, above all professor Wilfried Huber.

The billion-euro university fund

"Every talent counts" would also be a fitting title for this image. It shows just how attractive our university is among prospective students. In fact, since the introduction of the student selection process – or aptitude testing as it is also known ("Eignungsfeststellung") – demand has increased well above the national average. Just last year, the 2005 forecast had to be adjusted upwards, as indicated by the green star in the diagram (pg. 14). This will see us facing an increase of 55% over a period of ten years.

This jump in numbers is partly due to reforms in the German educational system, which will result in double the number of students completing their final secondary school examinations (Abitur) in 2011. This means that we are looking at long-term student numbers of 27 to 30 thousand, an approximate 30% increase on today's figures (pg. 14). At the same

time, we must systematically continue on our content- and structure-based modernization path in order to remain competitive at an international level.

We are beginning to feel the benefits of the billion-euro university program that I initially requested during the Dies Academicus 2005. This money will enable us to finance approx. 300 new positions by 2012 as well as a number of fast-track chair appointments and urgently needed property leasings. We are grateful to the Bavarian government for providing this billion-euro financial support, even if the step was a foregone conclusion. We have already fulfilled 48% of the expansion targets set in 2005 and are set to significantly exceed our original objectives.

We are well equipped to cater for the double influx of students in 2011. One of our measures includes fast-track courses in subjects suited to this style of learning. Under the motto "TUM two-in-one", particularly ambitious students who have completed the last ever 9-year cycle of secondary schooling (G9 students) have the opportunity to cover the content of their first two semesters from May to September. This will enable them to start their third semester in what would have been their first winter semester. It will be interesting to see how many students feel up to this rigorous challenge. It will of course mean sacrificing a whole year's vacation for both students and lecturers – a burden for all concerned.

Even in the past, independent research funding has enabled us to maintain our international reach. We would otherwise have long-since become a regional institute. These funds have created almost 2000 positions, including lecturing posts. The mutually agreed increase in duties for professors and research assistants equates to 400 further positions (around 24 million euros p.a.). As you can see, we are reaching ahead and taking on as many young talented students as possible and providing them with an excellent learning experience. But that is where our contribution ends.

Spending money on creating university places and enabling research is not the same as buying a product. It is an investment in the future, and one that promises high returns. Although as a leading industrial nation, we are struggling under the effects of the financial market crisis, and key industries and their suppliers are experiencing bitter economic downturn, this country of scientists and engineers has to invest in the innovators and shapers of tomorrow. 40 years ago, Germany invested 3.6% of its GDP in education and research. At a time when income levels were considerably lower than today, this contribution played a significant role in Germany's "Economic Miracle". Today, we are still aiming to boost spending just so we can reach the 3% target set down in the Lisbon Declaration. These two figures certainly provide food for thought.

Nowadays, economic crises and turbulence on financial markets are global events. And this is exactly why we should not stray from our goal of having the world's best higher education opportunities in place in 10 years' time when the effects of our shrinking population really start to be felt. We will only be able to attract interest from across the globe if we can measure ourselves with the best of the best. After all, the competition never sleeps. Only if we succeed in integrating these top levels of quality in an empowered, entrepreneurial university environment will the crème de la crème of young talent be tempted to come to Germany and, of course, pay for the services we provide, channeling revenue that currently flows to the USA and Australia back to Germany.

TUM Emeriti of Excellence

Faced with these future challenges, it is good to know that we can rely on the experience of those who have gone before us. When it comes to mentoring highly talented students, establishing new areas of research, strengthening and expanding our networks in the fields of science, economics, and politics, implementing internationalization measures or headhunting world-class professors – our 30 TUM EMERITI OF EXCELLENCE are with us every step of the way. I would like to express my thanks to all of you on behalf of the university community. We truly appreciate your continued support!

Honorary professors at TUM

Our deepest gratitude also goes out to our approximately 200 honorary professors. Their hands-on experience in business and industry is the perfect complement to our in-house competencies. They do not do what they do for the sake of a title (although there's nothing wrong with having a nice title), but are driven by a desire to support young academics – and to stay young at heart themselves. We intend to anchor the status of honorary professors in the university's forthcoming Lex TUM. Close ties to industry have been part of TUM's success story since the days of Carl von Linde. However, the number of women in this prestigious club is still shamefully low – we hope that the world of industry will help us remedy this situation. After all, we can't magic female executives out of thin air!

New endowed professorships

Fundraising is a tough business. Nevertheless, this has been a great year for sponsorships. Here are just a few examples:

Thanks to the support of Capgemini sd&m, we have been able to create the Global Software Development chair, our 25th since the year 2000. As a chemist, I have to admit that much of what this chair does goes over my head. However, I have been reliably informed that the chair will be focusing on the optimization of software and system development projects, focusing on capacity and costs over the entire project lifecycle. Then let's do it!

European Aeronautic Defense and Space Company (EADS) subsidiary Eurocopter, headquartered in Donauwörth near Munich, has established an Endowed Chair of Helicopter Technology at TUM. The move will ensure that research in this field does not become dispersed across international markets, but remains strongly anchored in Germany, helping to cultivate young engineers and scientists here at home.

Our carbon composites course is an interdisciplinary subject at TUM, centered around the SGL Endowed Chair for Carbon Composites. The chemical and structural properties of carbon composites make them ideal for use in a whole range of applications, for example in automotive and aviation industries or for the construction of chemical apparatus. This is a typical area of research for TUM. Our new chair-person, Professor Klaus Drechsler, will also be appointed Director of the forthcoming Fraunhofer-Institut in Augsburg.

The Endowed Professorship for Molecular Biocatalysis established by Süd-Chemie AG is an important part of the new "White Biotechnology" research center (Industrial Biotechnology), pooling research carried out at TUM's Garching, Weihenstephan and Straubing campuses. Industrial biotechnology uses microorganisms as catalysts for environmentally sound industrial production processes. This new technology has triggered a far-reaching global paradigm shift in chemical industries.

The Erich Rothenfußer Foundation aims to improve the standing of the much maligned fields of naturopathy and complementary medicine by helping develop sound methodical approaches for clinical applications. The endowed professorship also represents a valuable addition to a contemporary medical course of studies.

Founding new enterprises

Once again, we've been living up to our reputation as the entrepreneurial university by founding a number of new enterprises:

TUM International GmbH. The University Company markets our scientific competence and secures orders from within Germany and abroad. A major project in Saudia Arabia is a particularly prestigious example. Professor Hartmut Hoffmann and Dr. Mike Mattner are heading our Company.

The Mittelstandsinstitut (SMB Institute) is a joint venture with the Association of Bavarian Electrical and Metalworking Industries (Verband der Bayerischen Metall- und Elektroindustrie), aimed at promoting the exchange of research-related expertise with small and medium-sized businesses in Bavaria. This is an area of great potential. As a technical university with a long heritage, we have a great tradition of collaborating with major companies with strong research backgrounds. However, we are now looking to expand our cooperations to include small and medium-sized businesses, as these form the backbone of our national economy, bringing prosperity to the Bavarian region.

ForTISS GmbH is a research institute for software and system engineering (Forschungsinstitut für Software- und Systemengineering), headquartered in Garching. It incorporates state-financed research projects into national networks, where they are handled in the same way as regular contracts from industry.

The threads that make up spider silk are as strong as steel and as elastic as rubber. A research group headed by Dr. Thomas Scheibel, now chair at the University of Bayreuth, has determined the chemical and spatial structure of the particular protein fibers that make up these threads. Ten basic patents registered by TUM form the basis for the synthetic manufacture and industrial application of spider silk. This has led to the foundation of AMSilk GmbH, a company in which TUM has a 27% holding. So it is also in our best interests to wish these high-tech weavers every success with their business venture. Many of you may be wondering why we don't just use natural spider silk. The answer is simple: spiders are cannibals. This makes it impossible for them to be farmed. If you would like to find out more about how the researchers tackled this challenging problem, you can find a detailed article in our new science magazine "Faszination Forschung" (Discovering Science)!

Continuing along the same vein, I would also like to mention our new Leonardo da Vinci Center for Bionics (Leonardo da Vinci-Zentrum für Bionik). Bionics is a branch of science where technical advances are inspired by nature's designs and creations. Or put more simply, it turns biologists into engineers, and vice versa. Nature is a test laboratory packed full of exceptional diversity. It has always been an inspiration for technicians, powering a wide range of innovations from airplanes to Velcro fasteners. And it is becoming increasingly clear that we must return to nature's marvel of creation in order to develop increasingly complex technologies. Although nature does not provide engineers with actual blueprints, it does have the power to inspire and set strategic challenges. From the university's perspective, this new center is another example of how bridges are being built between disciplines that have evolved into independent fields over the years. We have provided 500,000 euros in start-up capital to get bionics research up and running. In our opinion, the center's objectives represent the perfect mix of inspirational and interdisciplinary research.

Welcoming families with open arms

We are determined to become Germany's number one technical university for gender equality and family-friendly policies. This area is even regulated in the German government's Initiative for Excellence. And we are certainly on the right path. Although I could name any number of examples here, I would like to draw attention to our latest project, our new children's center in Garching (Kinderhaus Garching). This new service would not have been possible without the support of a generous couple who are with us today but wish to remain anonymous. I would like to express my greatest thanks to these patrons.

I have now reached the end of my drastically shortened anniversary speech, ladies and gentlemen. We have had another good year, full of successful achievement and blessings. Thank you!