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„I can't see why the political basis of von Humboldt's idea of a university should be 'dead' today.“

Helmut Schelsky (1912-1984)

When I came to office as President of TUM back in 1995, I was eager to make my contribution towards the idea that the mission of university is to cultivate an atmosphere that is most conducive to freedom, speculation and creativity. Thanks to the TUM community's performance-oriented, international mindset, a fair number of reform initiatives have since been conducted, with considerable support from the Bavarian State Authorities, foundations and industrial partners. In a joint effort, we have undertaken significant structural changes in our transition towards becoming an entrepreneurial university based on the principles of competition and responsible subsidiarity. Our efforts so far have led

to the emergence of a fairly coherent Corporate Identity including both the student and professional bodies and an increasing number of alumni.

We are accordingly well prepared for the TUM INSTITUTE FOR ADVANCED STUDY. It constitutes yet another major challenge, holding the promise of concentrating our forces on scientific and corporate excellence. This idea was born out of the university-wide *innovaTUM-2008* project headed by Vice President Ernst Rank. In line with a peer-reviewed, bottom-up process, not only the most promising but also the most demanding focal areas of future science, engineering and medicine have been identified. The TUM Supervisory Board proceeded to charter the new TUM-IAS on July 13, 2005, this decision being subsequently approved by the Bavarian State Ministry of Science, Research and the Arts.

Much like the legendary Princeton IAS and several other, more recent institutes of this kind (for example, Swedish Collegium for Advanced Study in the Social Sciences; Netherlands Institute for Advanced Study in the Humanities and Social Sciences; Wissenschaftskolleg zu Berlin; Peter Wall Institute for Advanced Studies; Collegium Budapest), the new Munich foundation is based on the assumption that an atmosphere of creativity, inspiration, freedom and unbureaucratic support for excellent researchers forms the most productive catalyst for edge-cutting scientific achievements. It is

our goal to adapt this concept to the specific requirements of a Technical University, with special consideration being given to junior researchers. Our most distinguished members suffer from too much bureaucracy in their daily work, keeping them away from both their dedication to creative and speculative, risk-oriented research and from their most promising, gifted students. The mission of TUM-IAS is

- to provide top-level scientists with the freedom and resources needed to pursue innovative research and interact with gifted young scholars as their role models on an academic level, as well as with eminent colleagues from other disciplines (*interdisciplinarity*);
- to integrate distinguished visiting scientists from abroad, particularly the Humboldt Senior Awardees (as “*TUM Distinguished Affiliate Professors*”), and also their young scholars (*internationality*);
- to nurture new bright talent through the inspiring proximity of experienced senior scientists who devote their time to Humboldt’s teacher-scholar principle (“*akademische Schulbildung*”);
- to create a community of open, critical scientific dialogue.

The TUM INSTITUTE FOR ADVANCED STUDY is intended to bring our commitment for excellence to culmination and to foster TUM’s Entrepreneurial Spirit.

Since the new enterprise has to be highly competitive, it will set new standards, to which numerous junior scientists and engineers will in future aspire.

Our next steps will include defining the policy of the Institute. We are grateful that eminent members on our International Board of Trustees are willing to help us off to a good start. At the same time, the new TUM-IAS will be given its own building right at the center of our Garching HighTech Campus near Munich; the investment of approximately 10 million Euros will be shared by the State of Bavaria (“*Zukunftsoffensive Bayern*”) and generous private sponsors. Our ambitious fellowship programs – the heart of the institute – largely depends on the Excellence Initiative.

The aim of this brochure is to provide not only the academic community but also our friends and professional partners with up-to-date information on our new enterprise. We welcome any constructive criticism and support.



Prof. Wolfgang A. Herrmann
President
TECHNISCHE UNIVERSITÄT
MÜNCHEN

THE IDEA OF ADVANCED STUDY

More than a century after the revolutionary idea of the new university was implemented by Wilhelm von Humboldt (1767-1835) in Berlin, the great reformer Abraham Flexner (1866-1959) initiated the legendary Institute for Advanced Study (IAS) at Princeton (1930). He combined the Humboldtian principle of unity of unrestricted, free research and teaching with the Oxford College tradition. The latter was inspired by commensality and contemplation.

The Princeton IAS soon provided German intellectual refugees from National Socialism - like Albert Einstein, John von Neumann and Kurt Gödel – with an appropriate atmosphere of scientific and scholarly freedom. In principle, however, the Princeton IAS was founded as a postdoctoral institution devoted to the idea that young scholars at this level might well benefit from an energetic environment of scientific enthusiasm, intellectual exchange and dedicated, research-driven tuition by experienced senior scientists. This view very much resembled the Humboldt-Schleiermacher-Fichte philosophy which centers around individual teacher-scholar interaction (“*akademische Schulbildung*”):

“University is not made for professors nor is it made for students; university rather is the place where they both devote themselves to scientific learning for a certain period of time.”

(Wilhelm von Humboldt)

Similar initiatives derived from these intellectual routes have been launched ever since, with the specific focus of the various institutions depending on the situation. In many cases, the agenda was dedicated to humanities, political and social sciences, while natural sciences were not included until a later date. For example, the Princeton IAS now has four Schools: Historical Studies, Mathematics, Natural Sciences (predominantly astro and theoretical physics, molecular biology and genomics) and Social Science. In the meantime, more than one hundred IAS-type Humanities Research Centers have sprung up in the United States alone – most of them located on university campuses and closely linked to them.

It was Helmut Schelsky (*“Einsamkeit und Freiheit”* – „Loneliness and Freedom“, 1963), the great sociologist and educational thinker, who introduced the idea of Advanced Study to Germany, particularly emphasizing the interdisciplinary approach of research and higher learning. This coincided with the expansion of the German universities in the late Sixties and early Seventies (Georg Picht: *“Die deutsche Bildungskatastrophe”* – “The German Education Catastrophe”, 1964), when Schelsky stressed the value of thematically coherent research groups at the Bielefeld Centre for Interdisciplinary Research (ZiF). The specific situation of the then divided City of Berlin was the founding idea of the Wissenschaftskolleg zu Berlin (1978) – “to involve the city more closely in the international communication of sciences”.

With the support of a Foundation, the Swedish Collegium for Advanced Study in the Social Sciences (SCASSS) was established in Uppsala in 1985 as a national institution and the first IAS in Northern Europe. International research networks have been a characteristic feature of SCASSS from the outset. Prof. Björn Wittrock, the present Director of this institution, summarized the role of IAS-type institutes not only as “mere enclaves of intellectual freedom” but also as “critically important intellectual lighthouses for the future”.

One may add, for example, that the European Institutes for Advanced Study have greatly contributed to the East-West dialogue which was so beneficial for the political changes that have taken place over the past two decades.

The successful ones among the Institutes for Advanced Study combine two aspects: to allow academic scholars for an “hermeneutic exercise” („hermeneutisches Exerzitium“, Wolf Lepenies) and to create a scholarly community of excellence. More than any strong mission statement shall it be strong personalities who form the identity and reputation of these institutions.

LITERATURE:

Björn Wittrock:
Institutes for Advanced Study: Ideas, Histories, Rationales.
– Keynote Speech on the Occasion of the Inauguration of the Helsinki Collegium for Advanced Studies, University of Helsinki/Finland, December 2, 2002

Robert W. Connor:
Do Centers for Advanced Study Deserve a History?
– Ideas (National Humanities Center), Vol 9, No 1, 2002: pg. 26-32.

THE TUM INSTITUTE FOR ADVANCED STUDY

The TUM INSTITUTE FOR ADVANCED STUDY is a direct consequence of the quality project innovaTUM-2008 which was launched on December 7, 2004. In a university-wide, bottom-up process, the dual aims of innovaTUM-2008 are to reinforce TUM's existing strengths and establish new communities of excellence by restructuring academic programs (such as Life Science Engineering and several others). To this end, the university community is participating in a competitive process, during the course of which approx. 10% of the total resources will be allocated to the core competences, as identified by an external peer-review process in 2005.

The formal approval of the TUM Supervisory Board to register the institute as a cross-faculty legal entity was given on July 13, 2005 and confirmed shortly afterwards by the Bavarian Ministry of Research, Science and the Arts.

From the point of view of TECHNISCHE UNIVERSITÄT MÜNCHEN, the IAS setting is particularly desirable and attractive in terms of the vision to achieve a special community that is held together by a common intellectual dialogue.

At first glance, a Technical University may look like a perfectly uniform academic culture, but this is obviously not the case. Firstly, engineering and natural sciences follow different research approaches that are clearly associated with different trains of thought. Medicine has yet another research culture, depending on whether the thematic focus is more on the science side (such as tumor research) or on the engineering side (such as instrumentation, tissue engineering, etc.). The second, more serious aspect is that, to our way of thinking, a truly modern Technical University warrants the intellectual "*backbonding*" of the new, increasingly complex technologies to the Humanities and Social Sciences. This process would not be possible without the contribution of outstanding experts in their respective fields,

nor without the scholarly implementation of such issues on a high, intellectually demanding level. University is exactly the right forum to exercise this dialogue by virtue of coherent thematic research.

The TUM-IAS starts off as an experiment: little is known so far as to how science, engineering and medicine can efficiently interact in an Advanced Study setting of the traditional type. Engineers normally depend on properly organized research teams with individually specialized topics (e.g. energy research, information technology). As a rule, interaction with industrial research laboratories has to be taken care of, frequently as part of the day-to-day routine. For this reason, well-developed management skills are essential. In many cases, the situation has become similar in the natural sciences, particularly in new, cutting-edge fields of research such as biophysics, biomaterials science and engineering, nanotechnology, genomics and metabolomics. On the other hand, TUM has systematically improved its interdisciplinary agenda, with new areas like the nanoscience sector (including the new 20 MW-Neutron Research Source), building chemistry and building physics, nutritional medicine and biomedical engineering being typical of this strategy.

The university is accordingly well prepared now to focus on the most outstanding faculty and give them generous support in TUM-IAS thematic research alliances and, eventually, as TUM-IAS Fellows. Proven disciplinary excellence, interdisciplinary capability and a convincing personality as dedicated academic teacher are clearly the key prerequisites for being elected as a TUM-IAS Fellow.

The interaction with distinguished researchers from outside – typically the Alexander von Humboldt Research Awardees (pg. 28) – and with exceptionally talented, aspiring junior scientists, predominantly on the post-doctoral and the PhD level (pg. 18 - 20), in a common effort is the main objective of TUM-IAS.

Regarding its concept, the Institute challenges an extraordinary level of interdisciplinary research for the most distinguished TUM scientists but, at the same time, becomes attractive to brilliant senior and junior Fellows from outside and from other disciplines. This sets the scene for a scientific dialogue that goes beyond disciplinary borders.

COMMITMENT AND STANDARDS

The TUM INSTITUTE FOR ADVANCED STUDY embodies this university's principles as regards

- inspiring TUM's scientific elite by instilling a competitive spirit and teamwork skills while challenging them through the presence of international colleagues of equal rank – nobody at TUM-IAS is 'more equal' than others – either from the point of view of academia or industry;
- spurring on young scientists participating in active research alongside outstanding scholars (academic role models);
- recognizing and providing the benefits of a free, creative organization of time and talent.

The TUM-IAS will support inspiring basic research through interdisciplinary initiatives. Important advances in knowledge are expected from these initiatives. The institute brings together researchers from TUM with distinguished scholars from around the world to jointly conduct fundamental research. The research must comply with the standards of *fundamental – interdisciplinary – innovative – unique*. One of the university's main aims is to create a community of scholars who contribute significantly to the intellectual life of TUM. This challenge is by no means reduced to science and engineering, but also depends on the humanities and social sciences.

The foundation of TUM-IAS is a result of the TUM community's commitment. For this reason, ambitious support from inside the university can be taken for granted. There is also a general understanding that the institute

- must be independent from the university, from the government and from commercial enterprises;
- must target a stable net annual budget of around 10 million Euros in 2011 to operate competitive Fellowship Programs, the Research Funding, Symposia Programs, and Management Operations;
- must be open for endowments and is thus a prime project in the ongoing TUM fundraising campaign "Allianz für Wissen";
- must achieve a high-level assessment with regard to the individual selection of Fellowship candidates, be it junior or senior Fellows;
- must set the TUM benchmarks to safeguard long-term scholarly quality and, in doing so, act as a worthy role model across the entire university community.

These principles are considered to truly reflect the entrepreneurial spirit of TECHNISCHE UNIVERSITÄT MÜNCHEN. The International Board of Trustees, composed of independent experts from the relevant sectors of professional life, will supervise the strategy and standards of the institute (pg. 13 - 14).

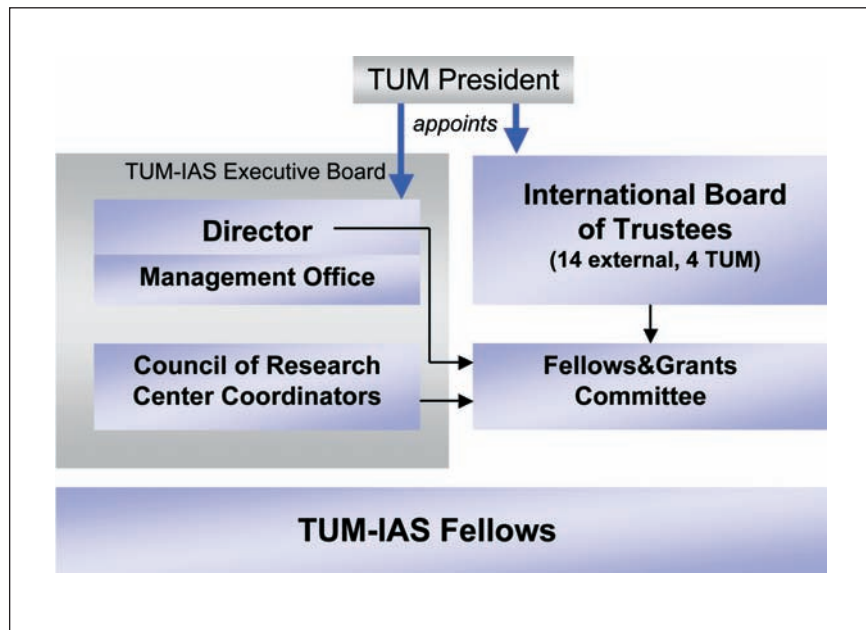
ORGANIZATION

The TUM INSTITUTE FOR ADVANCED STUDY has a lean organization. It relies on the experience that excellent, and responsible people elect individuals on their own level of performance.

The INSTITUTE MANAGEMENT, responsible for the operational business, is headed by the DIRECTOR who represents the Institute with regard to in-house and external affairs. He/she chairs the Executive Board and the Fellows & Grants Committee, and is responsible for finances and fundraising. The Director is ap-

pointed by the President based upon proposals submitted by the Council of Research Center Coordinators approved by the International Board of Trustees. He/she is a permanent guest on the TUM Executive Board of Management.

The Director is advised by the Council of Research Coordinators and the International Board of Trustees (IBT). He/she prepares the annual report for the IBT and TUM describing in the projects, achievements and eventual possible drawbacks that the Institute may have to face.



The EXECUTIVE BOARD consists of the Director and the Council of Research Center Coordinators. It advises the Director in financial affairs. The Executive Board also nominates the (external) members of the International Board of Trustees who are then appointed by the President. The Executive Board elects the Fellows and grants research projects based on proposals by the FELLOWS & GRANTS COMMITTEE.

The INTERNATIONAL BOARD OF TRUSTEES advises the Director on general scientific, organizational and technical issues. The Board also defines the general strategy and standards of the Institute.

In the COUNCIL OF RESEARCH COORDINATORS, most prolific scientists of the university represent the focal research areas that have resulted from the innovaTUM-2008 review process.

This ensures that TUM-IAS has the best possible expertise at its fingertips on a professional level but minus the static codification. Instead, the Council provides the highest level of inter-university professional dialog (interdisciplinarity).

In this way, the Institute stands to become an attractive address for top-level, external scientists, too. What we are aiming for, over and beyond the actual topics of interest concerned, is the cultural reference on the part of the technical/scientific and medical disciplines back to the humanities, cultural and social sciences, which also explains why Fellows from these latter fields are also to be elected. The constellation of the INTERNATIONAL BOARD OF TRUSTEES underpins this purpose. If it can be realised, the existing Carl von Linde Academy will radiate a tremendous inward and outward appeal*.

* At present, TUM conducts a faculty search for a new full professorship in the general area of the humanities. The professor to be hired will also chair the Academy; negotiations are in progress.

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WOLFGANG A. HERRMANN**
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Research
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Stuttgart (Germany)

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Collège de France
Nobel Prize in Chemistry 1987
Strasbourg – Paris (France)

PROFESSOR WOLF LEPENIES

Emeritus Chair of Sociology,
FU Berlin
Rector of Wissenschaftskolleg zu
Berlin (IAS) 1986-2001
Friedenspreis des Deutschen Buch-
handels 2006*
Berlin (Germany)

**Quote from the laudatio: „He proves in word and
deed that there is an inextricable connection be-
tween behavior and knowledge, between ethics and
science.“*

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Chair of Philosophy, Konstanz
University
DFG Leibniz Research Award 1989
Arthur Burkhardt Award 1992
Konstanz (Germany)

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Department of Chemistry,
Massachusetts Institute of
Technology
Nobel Prize in Chemistry 2005
Boston/Mass. (USA)

DR. GEORG SCHÜTTE

Secretary General, Alexander von
Humboldt Foundation (AvH)
Bonn (Germany)

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Chair of Mechanical Engineering
Max Planck Research Award 1999
Fellow American Society of
Engineering
University of California
La Jolla/Calif. (USA)

INTERNAL MEMBERS

PROFESSOR ANGELIKA GÖRG

Life Sciences - Proteomics
Heinz Maier-Leibnitz Medal 2001
Technische Universität München

PROFESSOR MARION KIECHLE

Director, Department of
Gynaecology
Chair, Bavarian State Government
Bioethics Commission
TUM University Hospital

PROFESSOR JOACHIM HAGENAUER

Chair of Telecommunications
Engineering
IEEE Fellow 1992, IEEE Alexander
Graham Bell Medal 2003
Technische Universität München

PROFESSOR PETER WILDERER

Chair of Water Technology &
Management
Stockholm Water Prize 2003
Technische Universität München

FELLOWS AND GRANTS COMMITTEE

TUM-IAS Director (Head) plus 2 members from the Council of Research Center coordinators and 3 members from the International Board of Trustees

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**PROFESSOR
Rüdiger WESTERMANN**
Informatics – Computer Graphics & Visualization

CORE AREAS OF RESEARCH

As a result of innovaTUM-2008, four core areas of research including 15 principal investigators were assigned to TUM-IAS. The main criteria were scientific originality, risk-oriented research topics, interdisciplinarity, and in particular the national and international standing of the respective researchers.

At the launch of TUM-IAS, the key investigators from the prime research areas form the TUM-IAS Council. They are basically eligible as Fellows. However, a strict individual review process is mandatory since becoming a TUM-IAS Fellow is anything but a foregone conclusion (see Organization). The shortlisted research areas are pooled under the umbrella of TUM-IAS. In this way, it is possible to promote trans-disciplinary areas of cutting-edge research, functioning as bridges between academic departments.

Each of the centers is based on several faculty and/or research groups within TUM's academic departments. More than 200 of these staff positions, including faculty positions (professorships), are financed by innovaTUM-2008. In addition, the TUM-IAS research centers are permanently granted 28 staff positions for general coordination and management. This gives them the opportunity to organize their respective research cluster. These positions already belong to the TUM-IAS.

What follows are the preliminary core research areas of TUM-IAS:

MOBILITY&ENERGY RESEARCH:

- Automotive Systems Engineering
- Mechatronics, Adaptronics and Automation
- Traffic and Transport (MobilTUM)
- Munich Center of Space Technology in Earth Science, Remote Sensing and Navigation (ESPACE) – GALILEO European Satellite Navigation Project
- Energy Systems and Electric Power Technology

BIOMEDICAL ENGINEERING:

- HighTech BioMed-TUM: Biomedical Microsystems Engineering
- Bavarian Center for Bioelectronics (BCB)
- Center for Applied Biophysical and Nuclear Methods in Medicine
- Life Science Engineering

MATERIAL SCIENCES:

- Bavarian Innovation Center for Catalysis (BayCat)
- Center for Nanotechnology and Nanomaterials (nanoTUM)
- Institute for Self-Organizing Systems and Molecular Engines
- Center for Renewable Raw Materials & Biogenic Resources

COMPUTING:

- Center for Computational Data Exploration (CeCDE)
- Center for Simulation Technology in Engineering (CeSim)
- Center for Innovation and Entrepreneurial Management (CIEM)

It goes without saying that all these issues are highly dependent on an interdisciplinary approach and on talented young researchers willing to engage in scientific teamwork.

At the same time, however, it would be unrealistic to expect the anticipated successes to materialize throughout the entire program. Some aspects may not get off to a reasonable start, others may not interact well enough internally. On the other hand, a defined framework structure acts as an incentive to compete for the available resources and to enhance the program by bringing in top-level expertise from outside, in the form of Alexander von Humboldt Research Fellows, for example.

Most if not all of the above areas have a social and societal impact. The TUM-IAS is thus interested to attract outstanding Fellows from the humanities and social sciences very soon.

It is to be emphasized that the main criterion for a Fellowship at TUM-IAS is not how well a candidate fits into the aforementioned fields of research, but solely his/her personal academic brilliance. In the long run, the institute will define its research domains from among the body of Fellows.

FELLOWSHIP PROGRAMS

Since the newly established TUM INSTITUTE FOR ADVANCED STUDY has been entrusted with an international mission right from the outset, its success depends crucially on the formation and steady expansion of a community of the best scientists in their respective fields of research. It is for this reason that the founding idea of the Institute was designed to team up TUM members (Carl von Linde Senior Fellows) with international experts (Hans Fischer Fellows) and to integrate capable young scientists with a view to pursuing the spirit of independent research.

In this context, it is important to take the specific research cultures of a Technical University into consideration. In present-day science, engineering and medicine, truly competitive research depends not only on innovative ideas but also, in many cases, very much on research teams who display a wide range of expertise – from technical skills to sophisticated theoretical knowledge. It is on these grounds that TUM's recent policy has encouraged trans-disciplinary fields which frequently call for specialists from several different faculties (such as mechatronics, genomics, catalysis, information technologies, tumor research).

For example, innovative automotive technologies can only be taken into a new dimension if engineers collaborate with experts from the fields of informatics, materials science, traffic organization, ergonomics, etc. It is therefore quite commonplace for internationally distinguished engineers to be put in charge of large-scale research teams, to collaborate with industry and organize sizeable funding schemes. This is one of the main reasons why they rarely take sabbatical leave. We know from other scientific cultures like the humanities and social sciences, however, that liberation from everyday routine and the ever-present network of miscellaneous duties (which often have nothing to do with science) serves to restore creativity and reinforce the power of original thought.

To this end, the TUM-IAS will provide the financial framework for outstanding professionals to stand in for Carl von Linde Fellows in the execution of their regular institutional duties (substitute professors). This will give aspiring young lecturers in particular the chance to lead a large team of researchers and gain valuable early experience for their future careers. This aspect is covered by the TUM-IAS budget.

THE TUM-IAS IS CURRENTLY DESIGNED FOR FIVE FELLOWSHIP PROGRAMS:

- The **CARL VON LINDE SENIOR RESEARCH FELLOWSHIP** is open to TUM faculty to devote themselves entirely to their research for a total period of 1-3 years, free from any institutional constraints, unrestricted by teaching obligations, administrative functions or – in the case of the Medical School – from obligations in the TUM University Hospital. Selected researchers who have already proven their excellence in past performance and intend to explore innovative, high-risk topics in their scientific research areas, if possible within a trans-disciplinary team, are eligible for this Fellowship.
- The **CARL VON LINDE YOUNG RESEARCHER AWARD** aims to support postdoctoral fellows on the basis of excellence for up to 3 years, at least 1 year of which should be spent abroad. The selected candidates will have the prospect to enter a tenure-track faculty position at TUM afterwards. Qualified *female researchers* will be given priority in this Fellowship program.
- The **HANS FISCHER FELLOWSHIP** is open to renowned international scientists, the selection being based on a peer-reviewed joint proposal by the applicant and a TUM host institution. The elected Fellow becomes a “*TUM Distinguished Affiliate Professor*”, which

also applies to Alexander von Humboldt Senior Research Awardees at TUM who receive additional TUM-IAS research money to maximize their research efficiency during their spell at TUM.

- The **HANS FISCHER TENURE-TRACK PROFESSORSHIP** is open to outstanding “*junior*” or “*assistant*” professors. They are hired from outside, collaborate with the TUM-IAS Senior Fellows and get a chance to receive tenure at TUM after 5 years following a strict peer-review in the fourth year.
- The **RUDOLF DIESEL INDUSTRIAL FELLOWSHIP** addresses highly qualified researchers from industry who will be offered a Temporary Affiliated Professorship of 6-12 months duration at TUM-IAS. This deliberate attempt to incorporate industrial researchers in TUM’s top-level research aims to overcome the existing barrier against personnel exchange programs between academia and industry.

In the first year of 2007 it is planned to begin with two Carl von Linde Seniors and two Hans Fischer Seniors respectively. A further total of 8-12 Senior Fellows are to be added in each subsequent year. The diagrams in Fig. 1 depict this development, including the respective Junior Fellows. At the same time, we expect that about 10 Senior Research Fellows can be financed from the budget of the Alexander von Humboldt Foundation (see page 28).

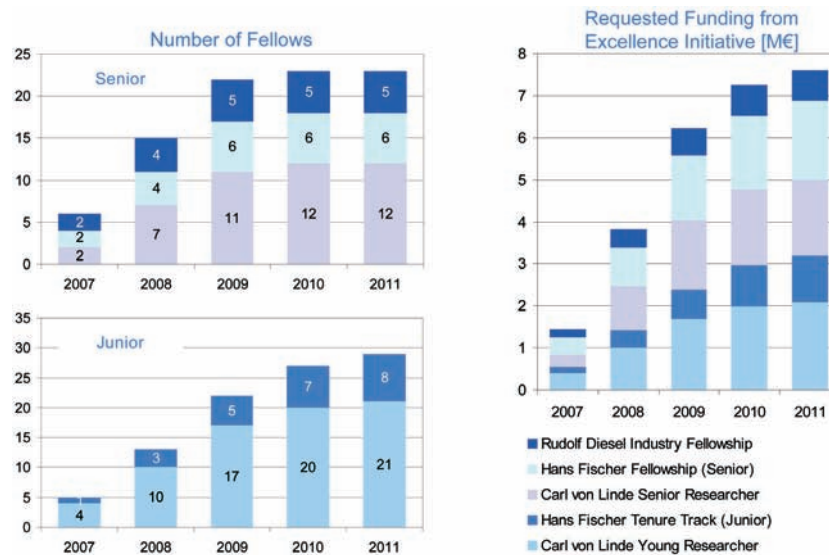


Fig. 1: The TUM-IAS Fellowship Programs of Excellence: (a) prospected number of Junior Fellows (left, below) and Senior Fellows (left, above); (b) total Fellowship budget in 2007 - 2011 (right) as requested from Excellence Initiative, 3rd Funding Line.

Young Research Group Leaders on top-level EU scholarships are other possible candidates for the TUM-IAS.

The Fellowship Programs are highly selective through a strict external referee process. On the other hand, optimal working conditions will be provided (e.g. full access to the university's electronic service, to a large body of electronic journals, databases and other electronic research tools). We have purposely refrained from stipulating any specific obligations regarding TUM-IAS Fellows' teaching commitments.

They are free to make their own decisions as to how they want to interact with the junior researchers. We feel sure that they know best how to live up to their role-model status.

The future Visitors Centers on the Campus as well as the TUM Visitors Center in downtown Munich (Bayerischer Bauindustrie-Verband, see Excellence Initiative) will be available for the international guest Fellows in Residence. (The International Community Centre IBZ in Munich (Amalienstrasse) which is run jointly by TUM, LMU und MPG is already at their disposal.) The accommodation facilities for the Fellows are accordingly developing alongside the development of the TUM-IAS.

SUPPORTING THE SCHOLARLY COMMUNITY

Whether they are young or senior, members of TUM-IAS Fellows have to rely on adequate, unbureaucratic support for their work. Three services are to be provided to overcome the traditional barriers to excellent research:

SUPPORT FOR HIGH-RISK, HIGH-PERFORMANCE RESEARCH

German research funding systems are characterized by stringent peer reviews guaranteeing high scientific standards and maximum fairness in the assessment processes. Despite this system's undeniable success, it hardly encourages projects with a high risk of failure coupled with a high potential of landmark advances. TUM-IAS therefore wants to trigger high-risk projects for a period of up to three years by providing the necessary "seed funding". Key criteria include

- an outstanding past scientific performance on the part of the applicant, especially with projects that have delivered truly unexpected results, and
- the prospect of a seminal scientific breakthrough in the event of success.

Along the same lines as the criteria for one of our benchmarks, the "Peter Wall IAS" at UBC Vancouver, the unlikelihood of a project getting off the ground without institutional resources will be decisive for allocating TUM-IAS start-up support. A budget of approx. 1.7 million Euros p.a. has been set aside for the TUM-IAS' scientific work schedule.

In addition to this incentive, a bonus of up to 30% on top of the external funding already secured will be allocated to selected projects in order to explore novel research fields. This measure is expected to accelerate research into innovative, fundamental and trans-disciplinary subjects of topical interest. We are convinced that high-risk research also inspires speculative thinking and creativity among top-level PhD students under the auspices of outstanding senior scientists.

SUPPORT FOR LECTURES, SEMINARS, SYMPOSIA

Beyond research, there will be support to develop and foster a scholarly community. Here, lecture-, seminar- and symposia programs are on the institute's agenda to succeed the intellectual borders of disciplines, cf. pg. 23.

As the TUM-IAS is thought to be an exchange place of knowledge (*“Tauschplatz des Wissens”*), visiting Fellows from abroad are encouraged to give lectures at other places in Germany; the management office will help in arranging and organizing this.

SUPPORT FOR ORGANIZATIONAL MATTERS: TUM-IAS MANAGEMENT OFFICE

TUM-IAS will have a functional, yet lean management office for the daily work of the institute. Skilled staff are required in order to liberate the scientists from the burden of administration. Services like computer repairs and maintenance, event organization (conferences, talks), translation services and editing of foreign-language texts (including German for the international Fellows) will be available.

Fellows from abroad (including AvH Senior Research Fellows) also need assistance with such matters as police registration, residence permit, insurance matters and the choice of school/kindergarten for their children.

LIESEL BECKMANN SYMPOSIA

This TUM-IAS annual symposium is named after Liesel Beckmann (1914-1965) who was the first female professor at the “*Technische Hochschule München*”.

This series of seminars is intended to increase awareness for urgent educational and scientific-political issues of general significance for society (as a whole) and introduce into the topics under discussion any relevant experience from the point of view of the international Fellows.

In future, the subjects will be selected by TUM-IAS under the guidance of the International Board of Trustees in such a way that they serve to open up horizons for new mental and physical approaches in terms of social obligation based on actual scientific research.

The results will be incorporated in the work of the university and should serve to enhance the academic environment accordingly. The topic assigned to the TUM-IAS for the initial program in 2007 is: „*Women and Gender Equality: Key Challenge of a New-Century Technical University*”.



Fig. 2: Professor Liesel Beckmann

This will go hand-in-hand with one of TUM's central goals. The symposium is conceived to provide the stimulation for the President's initiative to appraise the technical and scientific courses from the point of view of their structural appeal to young women and gender equality in present-day society.

THE NEW INSTITUTE BUILDING

The TUM INSTITUTE FOR ADVANCED STUDY is the most ambitious project of the university to promote top-level research. It aims to promote awareness that an international university depends on internal and external competition.

Accordingly, both TUM and the State of Bavaria as well as private sponsors have committed themselves to erect a new building (Fig. 3 and 4). It will be located in the most prominent position, right in the center of the Garching HighTech Campus. Already the central location will demonstrate

the pivotal role assigned to the TUM-IAS in terms of the future strategy of the university.

The TUM-IAS Headquarters Building will be situated next to the University underground terminal (“U6 University Line”) which makes it close to downtown Munich as well as the LMU science campus to the south of Munich at Grosshadern and the Max Planck Institute of Biochemistry in Martinsried. The building will be in the immediate neighbourhood of the TUM departments of Mechanical Engineering, Physics, Chemistry, Mathematics, Informatics/ Computer Science,

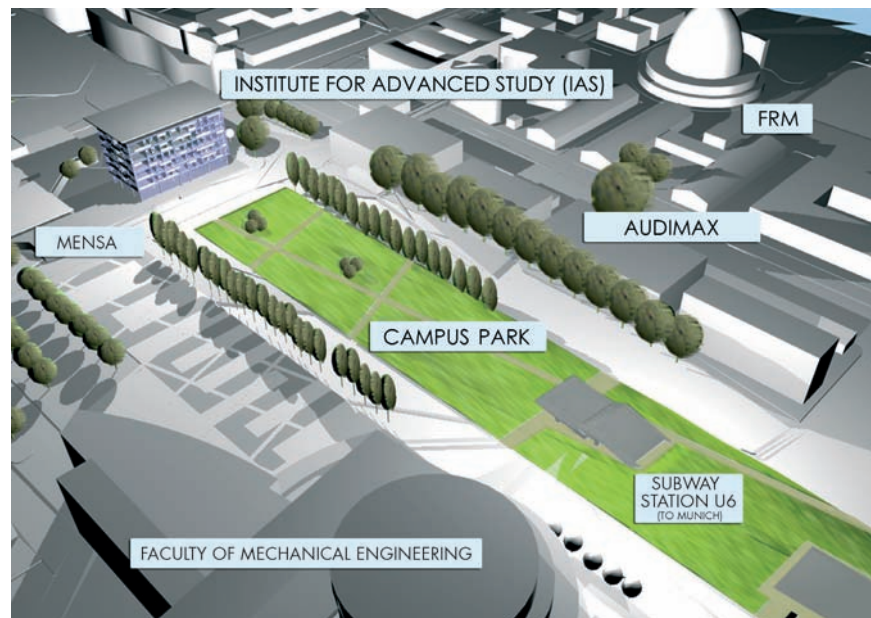


Fig. 3: The TUM-IAS Headquarters Building: central on Garching campus.



Fig. 4: Front view of the TUM-IAS Headquarters Building.

Medical Engineering and the “Heinz Maier-Leibnitz” Neutron Research Facility. It is halfway between the Munich and the Weihenstephan campus.

Garching is the ideal location for the TUM-IAS for other reasons: this campus

- is centrally positioned halfway between downtown Munich and the Freising-Weihenstephan campus belonging to TUM;
- already houses the majority of the TUM facilities (about 10,000 students, 3,500 faculty and staff members);
- accommodates three prominent Max Planck Institutes (astrophysics, quantum optics, extraterrestrial physics), part of the LMU physics department (nuclear physics), the European Southern Observatory and the General Electric European Research Center;
- has available an excellent network of well-equipped libraries and the Central Bavarian Computing Center;
- will be equipped with a Congress Center (Audimax) plus an Academic Guest House, catering and sports facilities, covered by an investment of roughly 40-60 million Euros till the end of 2010 (public/private partnership model);

- is located close to the Munich International Airport.

The cost of the new building amounts to approx. 10 million Euros, 40% of which will be covered by State funds (“*Offensive Zukunft Bayern*”) and the remainder through third-party donations raised with the help of TUM’s “*Allianz für Wissen*” fundraising campaign.

The building project is being managed by the Bavarian Building Authorities in collaboration with the TUM Bauamt (Director Heinrich Meyer). The technical concept is ready for approval, the funds are available, the first sod can be turned in September 2006. As the TUM-IAS has been given the highest priority among new building developments, the inauguration of the building is scheduled for the year of 2008.

The architectural philosophy can be described as follows:

The building lies on a slightly elevated area of land forming the north boundary of the „*main green axis of the campus*“ (Campus-Magistrale) and is situated immediately adjacent to the University Underground station (Munich Line U6), the refectory and the future TUM guest house. All the buildings on the campus are within easy walking distance.

A team of architects from the State Building Surveyor's Office of the TU München has drawn up a building concept with a transparent-looking main structure that forms a counterpoint to the existing institutional buildings, allowing TUM-IAS to transcend its central position and stand out from an urban planning point of view, as well. The skeleton of the building consists of reinforced steel pillars, the loft being executed in the form of a steel framework construction with a widely projecting attic. The building will be taller than most of the surrounding structures (e.g., refectory, Max Planck guest house).

The building will provide a total effective area of approximately 2,500 m², spread over 7 floors plus a basement. It is fitted with an elevator which will also make the TUM-IAS Faculty Club on the top floor available for large-scale events. The ground floor consists of a generous-sized foyer with a reception area. The 5 upper storeys are to house

- 65 studies (10 m² each)
- 8 seminar rooms (35-50 m² each)
- 1 video/teleconference room (30 m²)
- 1 conference and presentation room (160 m²)
- 10 archives/filing rooms (10 m² each)

as well as the administrative offices for the institute (Director plus staff) in addition to the general amenities required by the users (reading and tv

rooms, tea kitchens, copy rooms, secretarial offices, etc.). Each floor provides variable meeting areas for presentations, temporary project works, and meetings in different group sizes.

With about 300 m² of floor space plus an all-round roof terrace, the 6th floor (loft) has been conceived as a TUM-IAS Faculty Club and will serve as a venue for entertaining and social events, with catering facilities in the form of a restaurant.

The building will host the TUM CORPORATE COMMUNICATIONS CENTER which also supports the work of the Institute. The basement is designed for sporting and 'keep fit' activities and will be equipped with gym apparatus. The maintenance costs for the new building will be covered from the regular budget of the university.

The architecture of the TUM INSTITUTE FOR ADVANCED STUDY expresses a clear, avantgardistic language and creates an open-minded, friendly atmosphere at the central campus location.

TUM-IAS NETWORKING

The TUM INSTITUTE FOR ADVANCED STUDY not only meets with the overall approval of its founder university but also benefits from a rich environment from which to bring in additional expertise. Those institutions that complement the educational and social life of TUM-IAS are the most useful. These include primarily:

ALEXANDER VON HUMBOLDT FOUNDATION (AvH)

TUM's appeal to international, top-level visiting professors is nicely documented by the Alexander von Humboldt Senior Research Awards: within the past 5-year period (2001-2005), a total of 55 distinguished researchers from 14 countries joined TUM institutes to spend a sabbatical year; this figure ranks higher than any other German university. During the same period, 115 AvH Junior Research Fellows conducted their postdoctoral year at TUM.

The TUM-IAS provides us with an excellent opportunity for integrating AvH Senior Research Fellows (about 10 per year) into the Institute as "TUM Distinguished Affiliate Professors" and giving them a much better insight in the university community

and ways of interacting at close quarters with leading TUM-IAS Fellows on a more personal basis. The international spirit that the international experts radiate in their chosen fields of interest will have a beneficial effect on the atmosphere of the Institute. They will considerably enhance the lively intellectual dialogue across disciplinary boundaries. (At the same time, this is also a model project on the German university landscape which the Alexander von Humboldt Foundation has thoroughly deserved in its capacity as an outstanding German beacon of internationality.)



Alexander von Humboldt
Stiftung / Foundation

TUM STUDY&RESIDENCE CENTER AT RAITENHASLACH MONASTERY

Close to the city of Burghausen, in the scenic south-eastern part of Bavaria, the famous former Raitenhaslach Monastery is to be put at the disposal of the TUM as an off-campus study&residence center. The City Authorities of Burghausen have made a commitment for a 5-8 million Euro investment to adapt the baroque-style building to TUM's needs.

This excellent venue located on the bank of the Salzach river (and not far from the city of Salzburg) is ideally suited for contemplation



Fig. 6: The Aula ("Grüner Saal") of the former Raitenhaslach Monastery, 17th century.



Fig. 5: The Raitenhaslach TUM Study & Residence Center



Fig. 7: View of the scenic location of Raitenhaslach on the banks of Salzach River in the south-east of Bavaria.

and working in tranquillity, precisely in keeping with the TUM-IAS philosophy.

The building will be ready for use in 2008 and will also have sufficient space to accommodate scientists with their spouses and families for a longer period of time.

CARL VON LINDE ACADEMY

Thanks to a generous donation to mark the anniversary of Linde Aktiengesellschaft, the company which derives from the early TUM alumnus Carl von Linde, the CvL Academy was launched as a Corporate Institute in 2004. Its purpose is to enrich the science and engineering curricula of the university by integrating

(mandatory) courses in social and cultural sciences. It is part of TUM's philosophy that cultural awareness and an obligation to serve society are essential if scholars and scientists are to succeed in a global world of technology. At the same time, TUM endeavours to sensitize students to the societal benefits to be gained from culturally educated men and women – both beyond and interactive with science and technology. In the TUM-IAS context, the CvL-Academy forms the platform for organizing high-level lecture programs in the cultural and social sciences.



DEUTSCHES MUSEUM MÜNCHEN

The German Science & Technology Museum, Munich has a long-standing tradition of interacting with TUM whose President chairs the museum's Executive Supervisory Board. The two institutions have agreed to launch: a) the interactive telepresence program *TUMlive* where selected TUM scientists will present and explain their work predominantly to young visitors (for example, high-school classes) on a regular, bi-weekly basis; b) a platform in the "*Center of New Technologies*" where most prominent scientists – including those from the TUM-IAS – are present in person to discuss their work and their passion for science with a young audience. The interactive program thus forms an excellent opportunity to provide TUM-IAS Fellows with a public platform.



TUM SUMMER SCHOOL ACADEMY

There has been a long tradition of Elite Summer Schools at TUM. Most prominent are the Sarentino Valley Vacation Academy (Ferienakademie) in Northern Italy close to Bolzano, and the International Summer School Marktobendorf (Bavaria), dating back to 1985 and 1970, respectively. More recently, the Joint Advanced Students School (JASS) in St. Petersburg (Russia) was added (1999). TUM-IAS members will be most welcome as guest speakers and discussion partners in these and a number of other Elite Summer Schools (that have often emerged as recruiting pools for highly talented, particularly science-minded, qualified students). New Summer Schools will be established at the Raitenhaslach TUM Study & Residence Center, e.g. Graduate Schools (pg. 31 - 32).

TUM GRADUATE SCHOOLS

A TUM Graduate School system is under development within the context of the Excellence Initiative.

Both the

- TUM INTERNATIONAL GRADUATE SCHOOL OF SCIENCE AND ENGINEERING and the
- MUNICH MATHEMATICAL SCIENCE CENTER

(the latter with participation from the Ludwig Maximilians University Munich) rely on specialist dialogue between Scientists and Engineers.

That makes them attractive for students and scientists who are also interested in the sociopolitical dimension of their particular disciplines. For this reason alone, it can safely be assumed that the lecturers and students of the Graduate Schools will seek the proximity of the distinguished specialists attending the TUM-IAS and appreciate the colloquium and symposium program. The members of the Graduate School will benefit directly from the inspiration and potential for criticism provided by an excellent academic community.

BAVARIAN ELITE ACADEMY

The Bayerische Eliteakademie (Munich) provides excellent supradisciplinary training to a small, highly selective student group from the 10 Bavarian state universities. Part of the program is also suitable and available for research groups, so the junior-level IAS-Fellows are encouraged to attend the lecture and training programs.



THE TUM-IAS BUDGET

Apart from the Headquarter Building, the Raitenhaslach TUM Study & Residence Center and financial support resulting from innovaTUM-2008, the success of the TUM INSTITUTE FOR ADVANCED STUDY will greatly depend on the Excellence Initiative. As a consequence, 53% of the requested funding in the 3rd Funding Line – Institutional Strategy to promote Top-Level Research – are assigned to TUM-IAS. The total costs for the Fellowship Programs amount to approx. 26 million Euros for the five-year period from 2007 to 2011. This outlay can only be shouldered in the initial phase as part of the Excellence Initiative.

For this reason, the TUM-IAS is central to the relevant proposal “TUM.THE ENTRPRENEURIAL UNIVERSITY.” From 2012 onwards, TUM is prepared to sponsor TUM-IAS independently by means of a combination of its own resources and endowments. It may be advisable by then to convert the TUM-IAS into an independent foundation after a successful start-up period has occurred.

Additional support, specifically for TUM-IAS Fellowships, comes from a fair number of industries and foundations that have firmly committed themselves to TUM’s idea of Advanced Study (e.g, Linde, Fresenius, Siemens, Wacker-Chemie).

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INSTITUTE FOR ADVANCED STUDY AT TUM: THE LOGO

The triangle is a basic form of elementary geometry. Its sweeping opening in the main diagonal direction symbolises optimism, dynamics and advancement. It transforms to a doubly curved surface by the arching of a plane and so creates an association with the images of energy hyperfaces, structures of membranes and descriptive geometry. This stands for the technical and scientific foundations of the institute.

The symbology of the white-blue rhomboids is to show a relationship between regional roots and the location. The projected universal interweaving and networking of the Institute is reflected in the choice of a rhombic pattern. The individual elements are surrounded by and interwoven with others so that no single one can function without its neighbours. This emphasises the interdisciplinary professional and cultural mission of the Institute.

An analysis of all national flags resulted in a battery of seven colours, the combinations of which build links with the flags of the majority of nations of the world. Incorporation of this international colour pattern into the rhomboid structure illustrates the aspiration of the Institute to function as a globally networked establishment with an inherent potential for growth and development.

The TUM-IAS logo was designed by Florian Hugger and Thomas Rampp, two young TUM entrepreneurial alumni who graduated in architecture (1999).

