Internationalization and TUM’s strategy in the German ‘Excellence Initiative’

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ABSTRACT

On 23 June 2005 the German federal and state governments agreed on an initiative to promote top-level research in Germany. The so-called Excellence Initiative aims to strengthen science and research in Germany in the long term, improve its international competitiveness and raise the profile of the top performers in academia and research.

The total budget of the initiative will be €1.9 billion for the period 2006 through 2011, which is split between three lines of funding:

- Graduate Schools to promote young researchers  
- Clusters of Excellence to promote world-class research  
- Institutional strategies to promote top-level university research.

This Excellence Initiative launched an unprecedented atmosphere of departure at German universities resulting in a total of nearly 500 proposals for the three lines of funding. On 13 October 2006 after a highly competitive international review process the results of the first round of the initiative were announced. Only three universities, the Karlsruhe University of Technology, the Ludwig-Maximilians-Universität München (LMU) and the Technische Universität München (TUM) were successful in all three lines, giving them the unofficial title of an ‘Elite University’ and the expectation of about 150 Mio € additional funding for the next five years.

In the proposal of Technische Universität München internationalization plays a very prominent role. The promotion of high-level international research cooperation is central in the ‘TUM Institute for Advanced Study’, which has been founded as a cornerstone of the institutional strategy. And the ‘International Graduate School of Science and Engineering’ has as one major goal to stimulate international research groups of students during their Master’s and PhD studies, being supported by TUM and partner universities all over the world.

Starting from the general policy of TUM, the lecture will first focus on the overall strategy of the successful proposals, highlight their most important aspects and discuss the expectation from the projects over the next years especially in the context of further improving our international networks in research and education.
Kyoto, Feb. 1, 2007

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Ernst Rank
Vice President
Technische Universität München
Germany

Advanced Organizational Structure
1999 TUM constitution pioneered
Bavarian Higher Education Act 2006

Centers of Excellence Strategy:
Competitive restructuring program
innovaTUM (2003) allocates 10% total TUM resources to areas of excellence until 2008

Social & Cultural Awareness:
Linde Academy, Gender Responsibility

Internationality:
#1 A v H Senior Research Awards
Off-Shore Branch Singapore

Fundraising >100 M€ since 1999

Third Party Funding: 147 M€ (2005)
31% of total Budget, #1 GER

Entrepreneurial Assets:
UnternehmerTUM, TUM-Tech Ltd.
Superb Community Entrepreneurial Spirit

Innovative Strategies

- 21,000 Students
- 400 Tenured Professors
- 4040 Researchers
- 750 Ph.D/Habils p.a.
- 3800 Employees
- 12 Departments

32% female
20% international

TUM: A Unique Profile

INTERNATIONAL NETWORK: more than 150 partner universities

German Institute of Science and Technology in Singapore

Excellence Initiative by the German Government

"promote top-level research and improve the quality of German universities and research institutions, thereby making a significant contribution to strengthening science and research in Germany."

1.9 billion € ‘fresh money’ for German universities 2006 - 2011 (2 funding periods 2006-2010 and 2007-2011, 5 yrs. each)

Financing by federal (75%) and state governments (25%)

Three Funding Lines: Graduate Schools, Research Clusters and Institutional Strategies

Decision: 13 October 2006
Kyoto, Feb. 1, 2007

Results of the Excellence Initiative (1st Funding Period)

- 18 Graduate Schools
- 17 Clusters of Excellence
- 3 Institutional Strategies
- Concentration on 22 Universities
- Fields of Natural Sciences and Life Sciences more successful than Engineering and Humanities
- TUM one of the most successful universities

1st Funding Line at TUM: Graduate Schools

International Graduate School of Science and Engineering

Coordinator: Prof. Rank
Prof. Brandt / Prof. Grothe (LMU)
Prof. Konnerth (TUM)

2nd Funding Line at TUM: Clusters of Excellence

Cognition for Technical Systems
Coordinator: Prof. Buss

A.I.
Coordinator: Prof. Paul

Origin and Structure of the Universe – The Cluster of Excellence for Fundamental Physics
Astrophysics
Coordinators:
LMU: Prof. Carell
TUM: Prof. Skerra

Munich Center for Integrative Protein Science (CIPSM)
Proteins
Coordinators:
LMU: Prof. Kotthaus
TUM: Prof. Abstreiter

Nanosystems Initiative Munich (NIM)
Nanosystems
Coordinators:
LMU: Prof. Habs / Prof. Krausz

Munich Center for Advanced Photonics (MAP)
Photons
Coordinators:
LMU: Prof. Habs / Prof. Krausz

3rd Funding Line: TUM. The Entrepreneurial University.

Funding: 58 Mio € (2006-2011)

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- 17 Clusters of Excellence
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3rd Funding Line: TUM. The Entrepreneurial University.

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What does it take to be an entrepreneurial university?

“Entrepreneurship is the pursuit of opportunity beyond the resources one currently has under control”

Stevenson and Jarillo 1990

“How do universities, by means of entrepreneurial action, go about transforming themselves? Five elements constitute an irreducible minimum: a strengthened steering core; an expanded developmental periphery; a diversified funding base; a stimulated academic heartland; an integrated entrepreneurial culture.”

Prof. Burton R. Clark (1998), Graduate School of Education, UCLA

TUM-IAS: The Vision

• Provide top-level scientists with the freedom and resources to pursue innovative research (interdisciplinary – high risk, high reward)
• Interact with talented young scholars ('akademische Schulenbildung')
• Integrate distinguished visiting scientists (interdisciplinarity)
• Create a scholarly community of open scientific dialogue

Headquarters Building
• Central location on Garching Campus
• Secured funding, doubled to 10 M€ since submission of proposal

Fellowship Programs: Genuine, Competitive

- Carl von Linde Senior Research Fellowships open to TUM faculty
- Carl von Linde Junior Researcher Awards for postdoctoral fellows from TUM
- Rudolf Diesel Industrial Fellowships for researchers from industry
- Hans Fischer Fellowships open for international scientists
- Research Start-Up Support

Hans Fischer Tenure Track Professorships for young scientists from outside
Kyoto, Feb. 1, 2007

... at all career stages

- Student Admission Center (SAC) – International Recruiting Centers
- Welcome Office – International Student Service Center
- Summer School Academy
- Young Researchers Program
- Emeriti of Excellence Program
- Career Service Center

Kyoto, Feb. 1, 2007

... a challenge for Good Corporate Governance

- Gender Consulting & Awareness
- Childcare / Home Office Workplaces
- Family Care Structural Fund
- Gender Issues Incentive Fund
- Vocational Training
- Parental Leave Compensation
- Fundraising Focus: Scholarships for talented women in science

IAS Liesel Beckmann
Symposium 2007: dedicated to Gender & Diversity
Kyoto, Feb. 1, 2007

... to advance the spirit of community

- Best Practice Management - Training
- Process and Quality Management - Good Corporate Governance - Health, Care & Prevention Campaign - TUM Corporate Communications Center

The TUM Graduate School System

IGSSE Admission & Paths to Degrees

The TUM Graduate School

Admission & Paths to Degrees

International labor markets

'Elite' programs

Research & Development

PhD & IGSSE Certificate

Undergraduate (TUM & Int'l Univ.)

Research Topics

The TUM Graduate School System

Financial & Fiscal Policy Services

Thematic Missions

Graduate School of Information Science in Health

Research Topics
IGSSE Research Training Program

**Scientific Mentoring**
- Multiple supervision (PhD phase)
- Individual research training schedule for every student
- Student research groups interlink MSc and PhD phase

**Modular Training Program**
- Disciplinary training
- Trans-disciplinary training: e.g. summer schools
- International and industrial exchange
- Scientific skills training: research proposals, conferences, scientific leadership
- Soft skills training: business plan seminars, social awareness and communication skills, intercultural & ethical competence

**Scientific Mentoring**
- Multiple supervision (PhD phase)
- Individual research training schedule for every student
- Student research groups interlink MSc and PhD phase

**Research Training Groups (PhD Programs)**
- Based on existing structures (functionality & funding secured)
- Interconnected by common research topics

**Curricular Part**
- 120 ECTS
- Research 50 ECTS
- Research Pre-doctoral phase Doctoral phase
- Master's Degree Bachelor's Degree PhD & IGSSE Certificate

**Multi-disciplinary IGSSE Young Researcher's Teams**

Typical Team:
- 2 PhD students funded by IGSSE
  - >= 2 PhD students funded by industry
  - postdoc (team leader)
  - Collaborating research groups at partner universities

Current state:
- 10 research team proposals approved
- Collaborating institutions:
  - Univ. Stanford, Univ. Tokyo, DTU, Weizman Inst., ETH Zürich, TU Vienna, Univ. New South Wales, Duke Univ., DLR, Fujitsu Labs, …

**IGSSE Research Training Groups & MSc Programs**

- 7 Research Training Groups (PhD Programs)
- 10 Int'l. Master Programs
- Based on existing structures (functionality & funding secured)
- Interconnected by common research topics

**An Example: Numerical Simulation and Biomedical Technology**

Optimize endoprosthesis and fracture fixation procedures

- Material identification
- Very fast transfer from CT-scan to simulation model for individual surgery planning
- Bone regeneration
The Raitenhaslach TUM Study & Residence Center

The TUM Business & Industry Network