

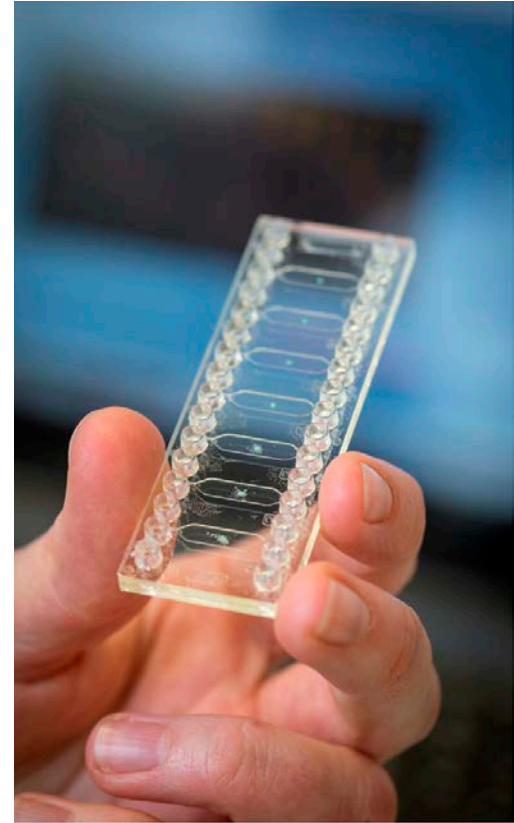
# Graz University of Technology TU Graz

# Graz University of Technology TU Graz

Prof. Dr. Urs Hirschberg  
Director TU Graz Field of Expertise  
“Sustainable Systems”

# Research at Graz University of Technology

- 5 Fields of Expertise
- > 50 H2020 projects including
  - 7 ERC Grants
- Research funded by the Austrian Science Fund:
  - Participation in 2 Special Research Areas
  - 4 START projects
  - 2 Doctoral Programmes
  - 6 Hertha Firnberg projects
  - about 50 ongoing Stand-Alone Projects



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# Research at Graz University of Technology

- 10 Christian Doppler-Laboratories
- Research funded by the Austrian Research Promotion Agency :
  - A total of about 130 projects in different funding schemes
  - Leading position in Austrian Competence Centres programme COMET as cooperation of science and industry (often project lead)
    - 4 out of 5 K2-Centres with participation of TU Graz
    - 14 out of 18 K1-Zentren with participation of TU Graz
    - 10 out of 18 K-Projekten with participation of TU Graz



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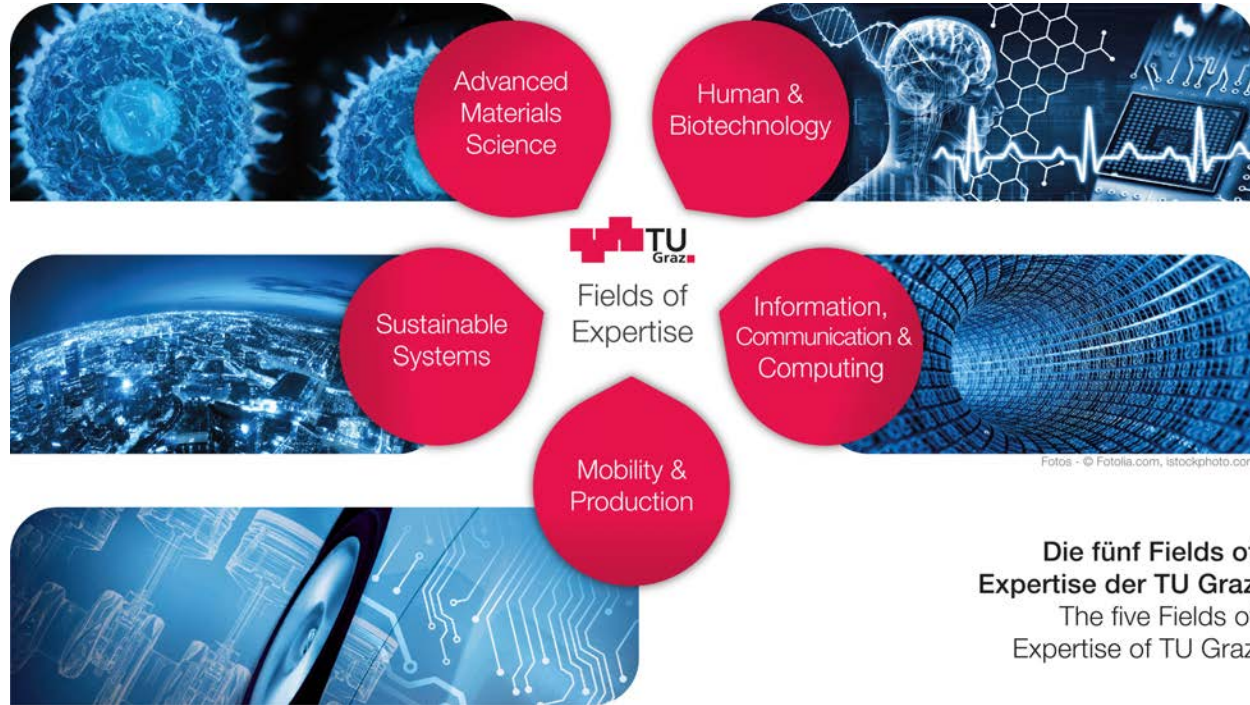
# Research at Graz University of Technology

5,16 % => highest regional  
R&D Quota in EU



- Patent applications (2007-2017): 433
- Granted patents (2007-2017): 225
- Cooperative Research
  - Public-public-Partnership: NAWI Graz, BioTechMed...
  - Public-private-Partnership: e.g. Siemens CKI  
(TU Graz one of only 8 CKI cooperative universities in the world  
among them University of California Berkeley, TU München)
- Business Incubator Science Park Graz
  - including European Space Agency Business Incubation Centre (ESA BIC)

# Fields of Expertise



**Die fünf Fields of  
Expertise der TU Graz**  
The five Fields of  
Expertise of TU Graz



# Fields of Expertise

Five promising fields of research at  
Graz University of Technology characterised by

- Excellence-focused research
- Interdisciplinarity
- Intensive collaboration  
with business and industry
- Strategic partnerships  
with national and international scientific organisations
- Participation  
in scientific competence centres and research networks



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# Fields of Expertise

TU Graz strengthens the fields through:

- New professorships
  - One professorship per Field of Expertise
- Systematic funding of interdisciplinary projects (lead projects)
  - Aim of raising the research profile of Graz University of Technology
  - High amount of special funding and competitive, reviewed selection process of projects
  - Focussed research topics
  - Maximum of 6 years (evaluation after 3 years)
  - International visibility



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# Fields of Expertise

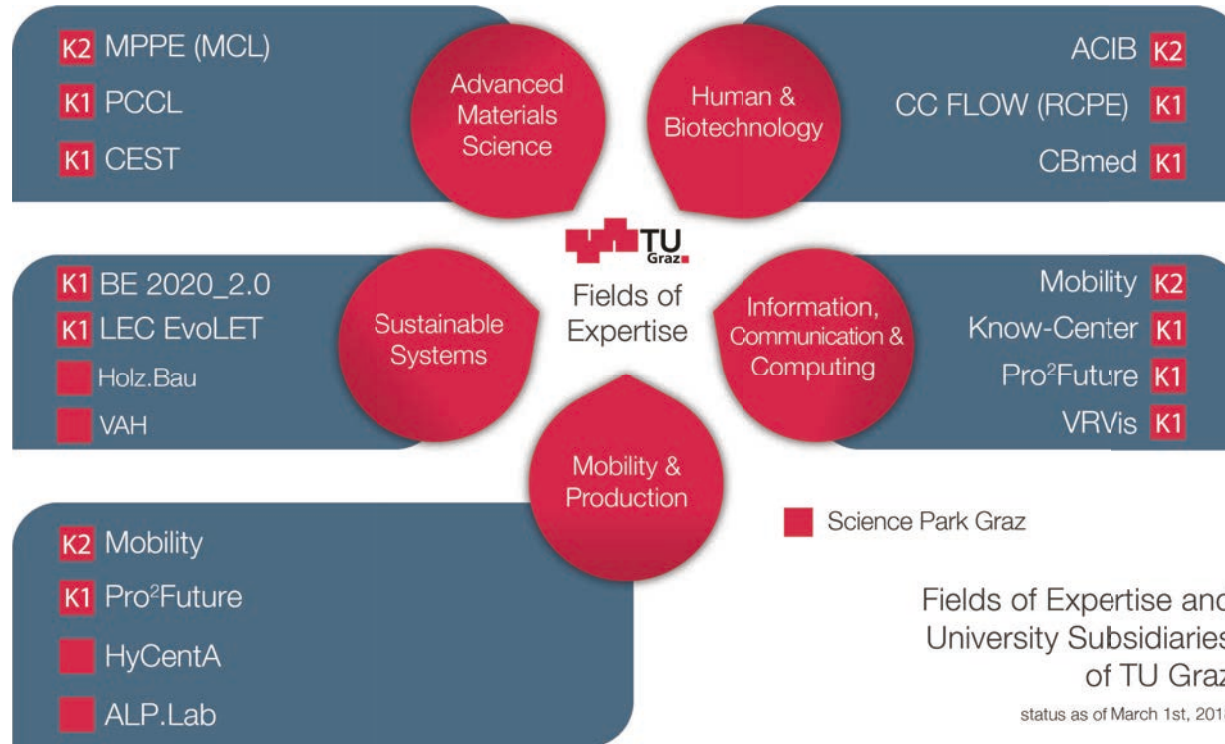


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TU Graz strengthens the fields through:

- Initial funding programme mainly for young scientists
  - To trigger project proposals
  - Grants of 10.000 € per project at maximum
  - 9 calls resulted so far in 185 initial fundings => lead to third party funding of almost 14.5 million Euros
- Teaching sabbaticals for research purposes

# Fields of Expertise and University Subsidiaries





# Sustainable Systems

## Research topics

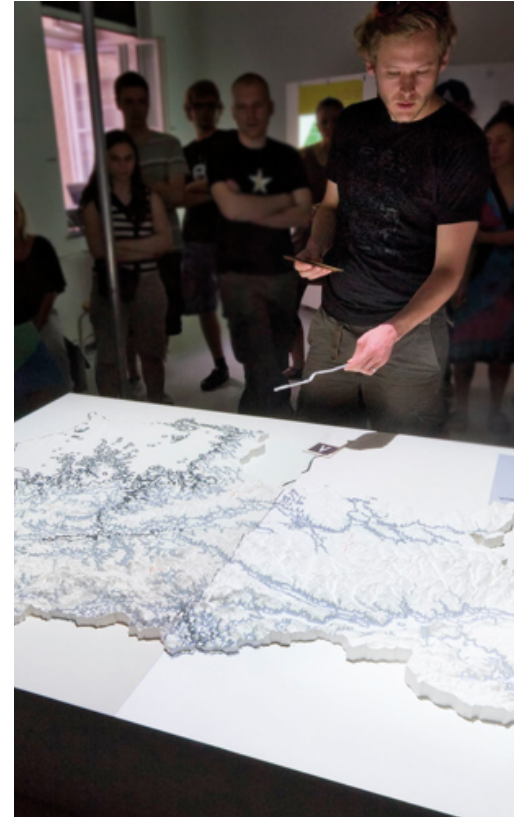
- More than 120 researchers involved from 47 institutes
- Ongoing projects 2017
  - Public funding: 117
  - Contract research: 103
- Research topics
  - Urban and mobility planning
  - Sustainable construction
  - Future-oriented energy systems





## Research topics in detail

- Urban and mobility planning
  - Landscape Urbanism – ecological synergies in urban and regional development
  - Smart Cities – energy-efficient urban-planning densification
  - Financing models in urban development
  - Smart Mobility – multimodal transport planning and intelligent traffic systems
  - Life-cycle costs in infrastructure (road, rail, supply lines)



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## Research topics in detail

- Sustainable construction
  - Form follows energy – energy concepts of buildings
  - Sustainability analysis of construction products and buildings
  - Resource-efficient, non-standard construction methods – prototype construction in the robot design laboratory
  - Resource-saving construction in lightweight and solid construction



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## Research topics in detail

- Sustainable construction (cont.)
  - Economic implementation of complex geometries and shapes in wood construction
  - Advanced wood and concrete technology
  - Optimal lighting – simulations and experiments in the lighting laboratory
  - Multifunctional facade engineering and media integration



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## Research topics in detail

- Future-oriented energy systems
  - Integral energy landscapes – historical development and future strategies
  - Numerical calculations and hydraulic model experiments for hydro power plants
  - Innovative system solutions for heating, ventilation and air-conditioning technology
  - Thermal energy systems and biomass exploitation



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## Research topics in detail

- Future-oriented energy systems (cont.)
  - Process evaluation and synthesis, and waste and emission-free technologies/systems
  - Simulations and experiments on thermal turbomachines and machine dynamics
  - High-voltage and distribution networks of the future, and energy-efficient electric drives and machines
  - Economic analysis of energy and electric systems



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# Shares in Companies and Cooperations

- Competence Centres and Networks
  - Bioenergy 2020+ (Comet K1)
  - VAH Versuchsanstalt für Hochspannungstechnik Graz GmbH (Comet K-Projects)
  - holz.bau Research GmbH (Comet K-Projects)



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## Field of Expertise Activities

- FoE Day “Sustainable Systems”
- FoE professorship for the research topic “Integrated Building Systems” (Michael Monsberger)
- Initial funding for 42 projects



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## Activities:

Buildings and  
Energy Day  
14.06.2018

Keynote  
Werner Sobek





## Activities:

Buildings and  
Energy Day  
14.06.2018

Poster  
Presentations



## Activities:

Buildings and  
Energy Day  
14.06.2018

Poster  
Presentations





# Degree Programmes and Further Education

- Numerous Bachelor's, Master's and Doctoral Degree Programmes
- University Certificate Programme for Further Education: Sustainable Construction



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A faint, light gray sketch of a large, classical-style building with multiple domes and columns, serving as a background for the slide.

# Science ■ Passion ■ Technology