How to shape education for a sustainable bioeconomy?

Case Study

Technical University Munich

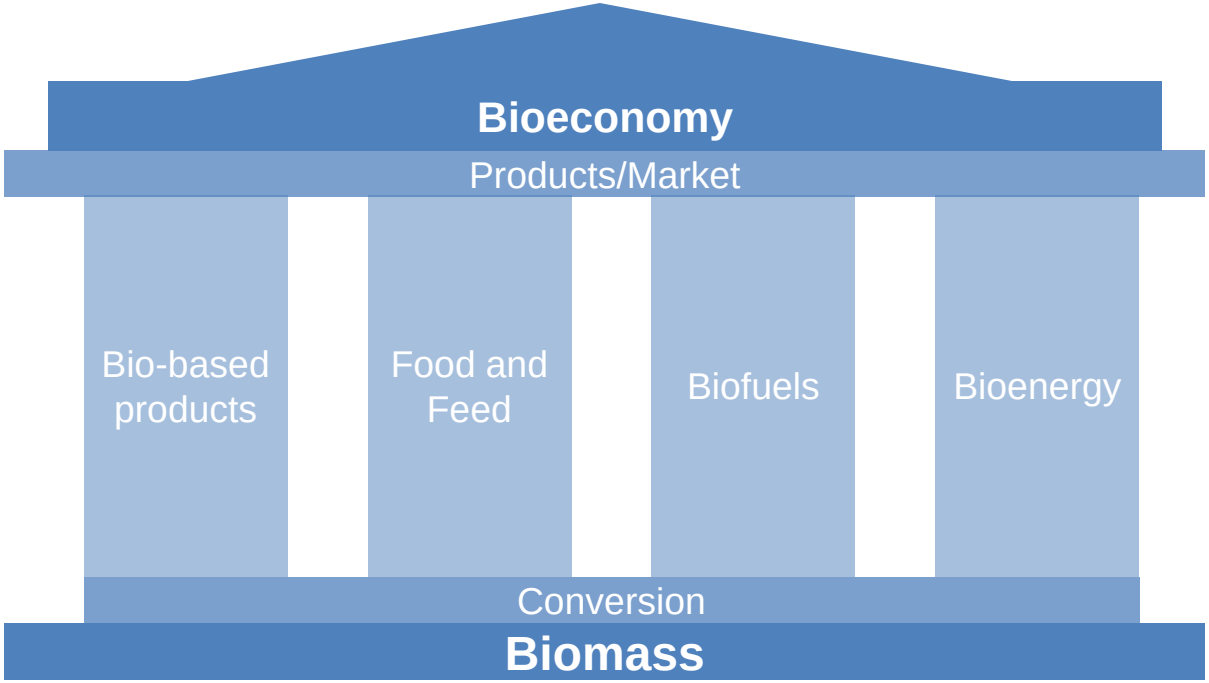
Campus Straubing for Biotechnology and Sustainability (TUMCS)

Prof. Volker Sieber, Rector TUMCS

Global Bioeconomy Summit, 16th to 20th of November 2020

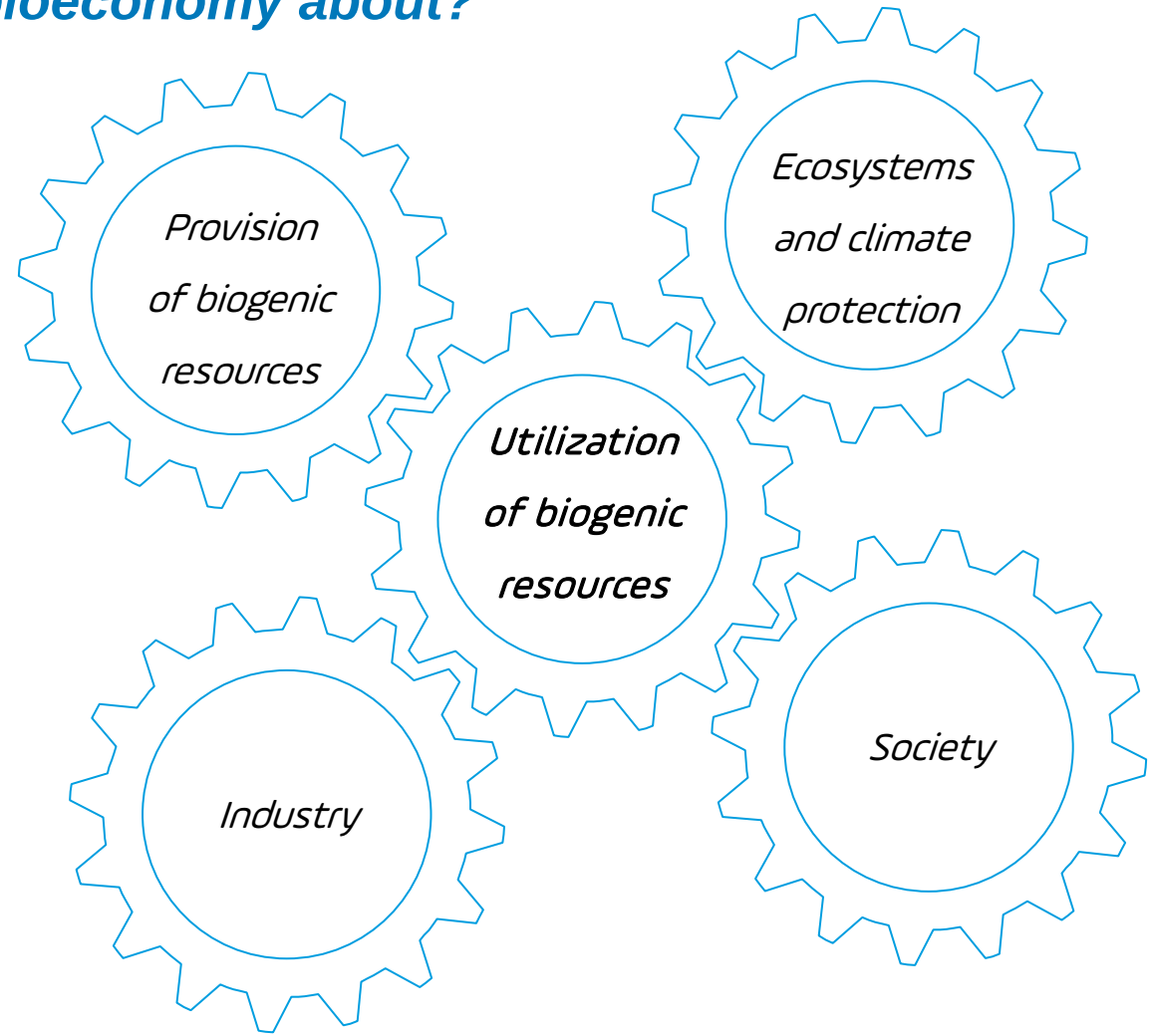
What is bioeconomy about?

Early concept of a future bio-based economy



Focus on the utilization of biogenic resources

What is bioeconomy about?



What is required for the upcoming structural change to a bioeconomy?

Conversion to mostly biogenic resources:

- Increased research (biological, chemical, physical, technical, engineering)
- Economic and social sciences, logistics, media and information technologies, must be adapted

Teaching and research must integrate these topics

Interdisciplinarity is essential for the realization of a bio-economy

How to approach bioeconomy education

Anchoring subjects of bioeconomy and sustainability within **current curricula**. is important but not **not sufficient** for advancing the bioeconomy and accelerating its development.

⇒ New study courses determined to the subject of bioeconomy
⇒ Professors/Lecturers etc. that work themselves interdisciplinarily and dedicated to bioeconomy

⇒ Dedicated site with interdisciplinary team and departmental structure.

=> Foundation of the Campus Straubing for Biotechnology and Sustainability of the Technical University of Munich

TUM Campus Straubing for Biotechnology and Sustainability

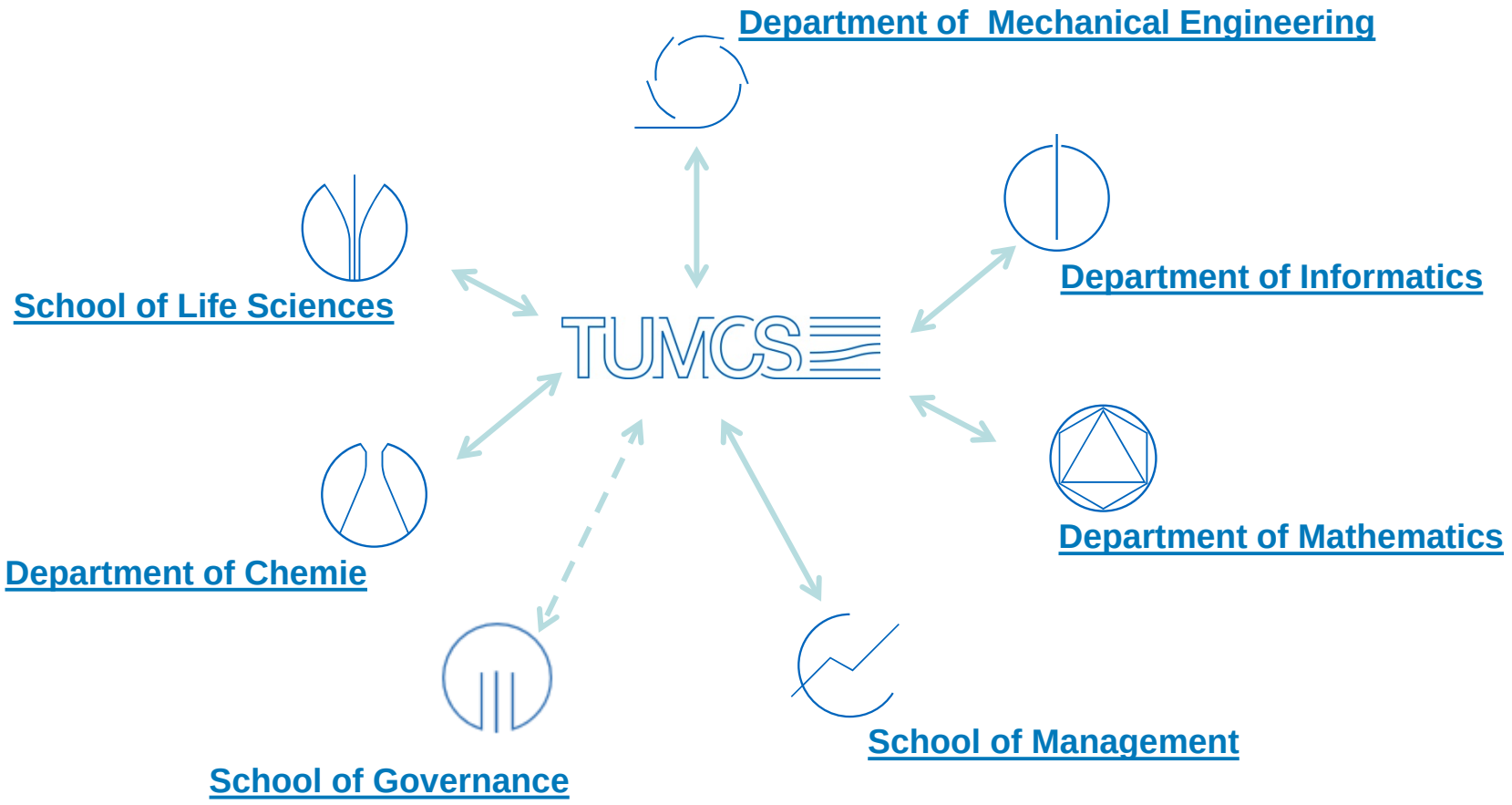
TUM in Numbers

ca. 600 Professors
ca. 11000 Coworkers
ca. 44000 Students

- # 50 QS World University Ranking
- # 41 Times Higher Education World Univresity Ranking
- # 54 Academic Ranking of World Universities (Shanghai Ranking)
- # 6 Europe´s Most Innovative Universities (Reuters)

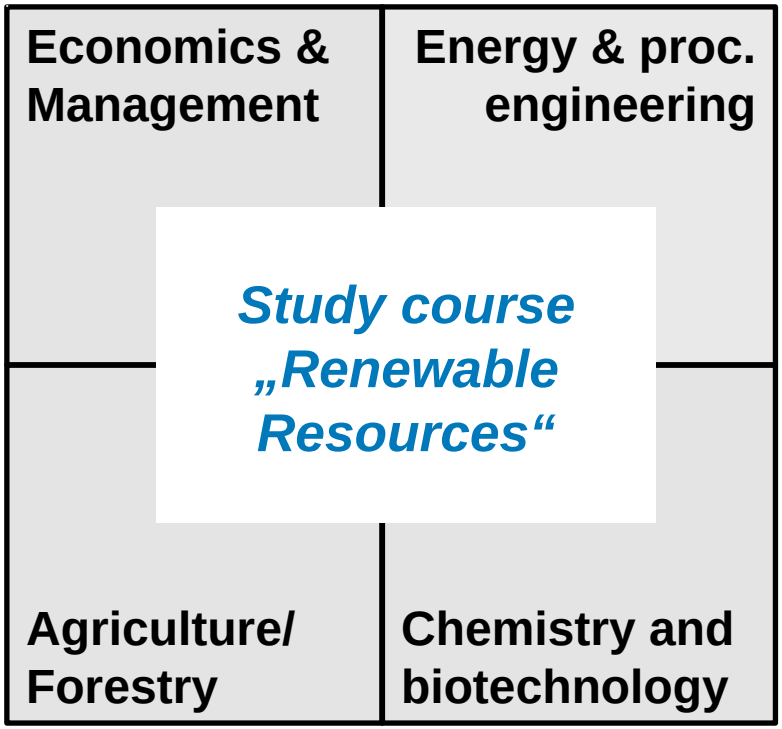
Straubing as Center of biogenic resources

TUMCS connects departments and schools of TUM in bioeconomy



Educating a new generation of scientists to enable bioeconomy!

Originally: One interdisciplinary study program with elements of four key areas: **natural sciences, engineering, economics and agricultur/forestry**



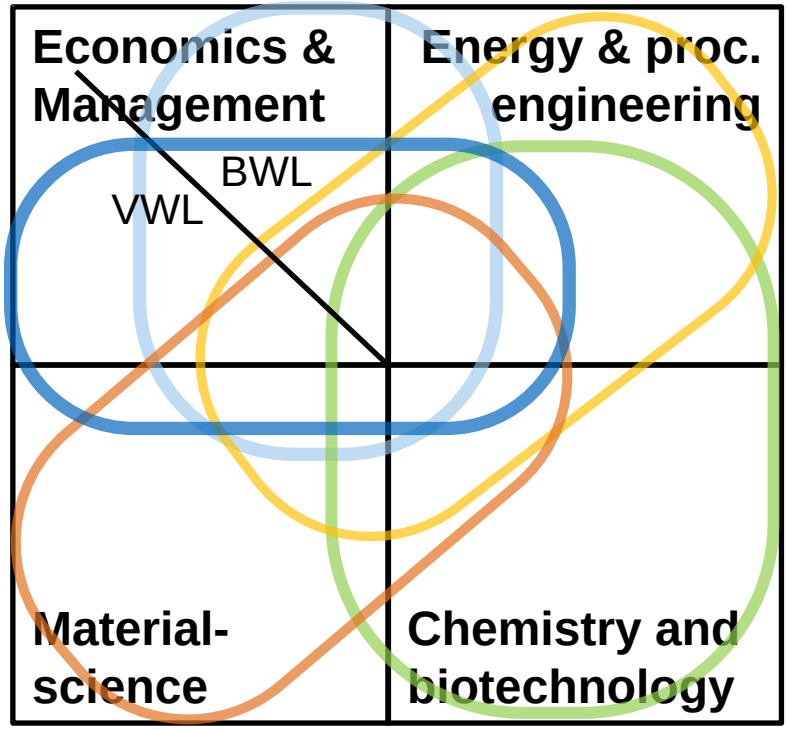
2008 – Master course
2013 – Bachelor course

⊕ Very broad and interdisciplinary
Employers highly appreciated the knowledge transfer and analysis skills of students

⊖ However: Too general, no speciality

Educating a new generation of scientists to enable bioeconomy!

New Interdisciplinary study programs with elements of
Biotechology, engineering, material science and economics



Study courses

- Chemische Biotechnologie (BA, 2017)
  Chemical Biotechnology (MA, 2020)
- TUM-BWL, Schwerp. NawaRo (BA, 2017)
  TUM-BWL (MA, 2021)
- Bioökonomie (BA, 2018)
  Bioeconomy (MA, 2020)
- Technologie Biogener Rohstoffe (BA, 2020)
  Techn. of Biogenic Resources (MA, 2021)
- Biogene Werkstoffe (BA, 2020)
  Biogenic Materials (MA, 2022)

Study Courses Bioeconomy and Management

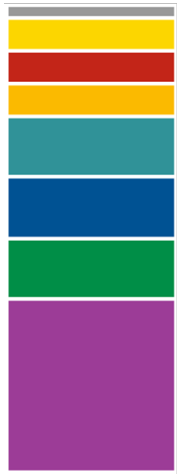
Management with focus Renewable resources:

[...] The graduates [...] are predestined and qualified to manage sustainability-oriented products, services and processes in individual companies and to generally anchor these aspects in corporate management.

Wahlmodule
Ingenieurwissenschaften
Naturwissenschaften
Management

Bioeconomy:

[...] Experts are needed to redesign the structural, economic, political and regulatory framework in the national economy and society in the direction of sustainability and thus also to increase acceptance among all affected actors.

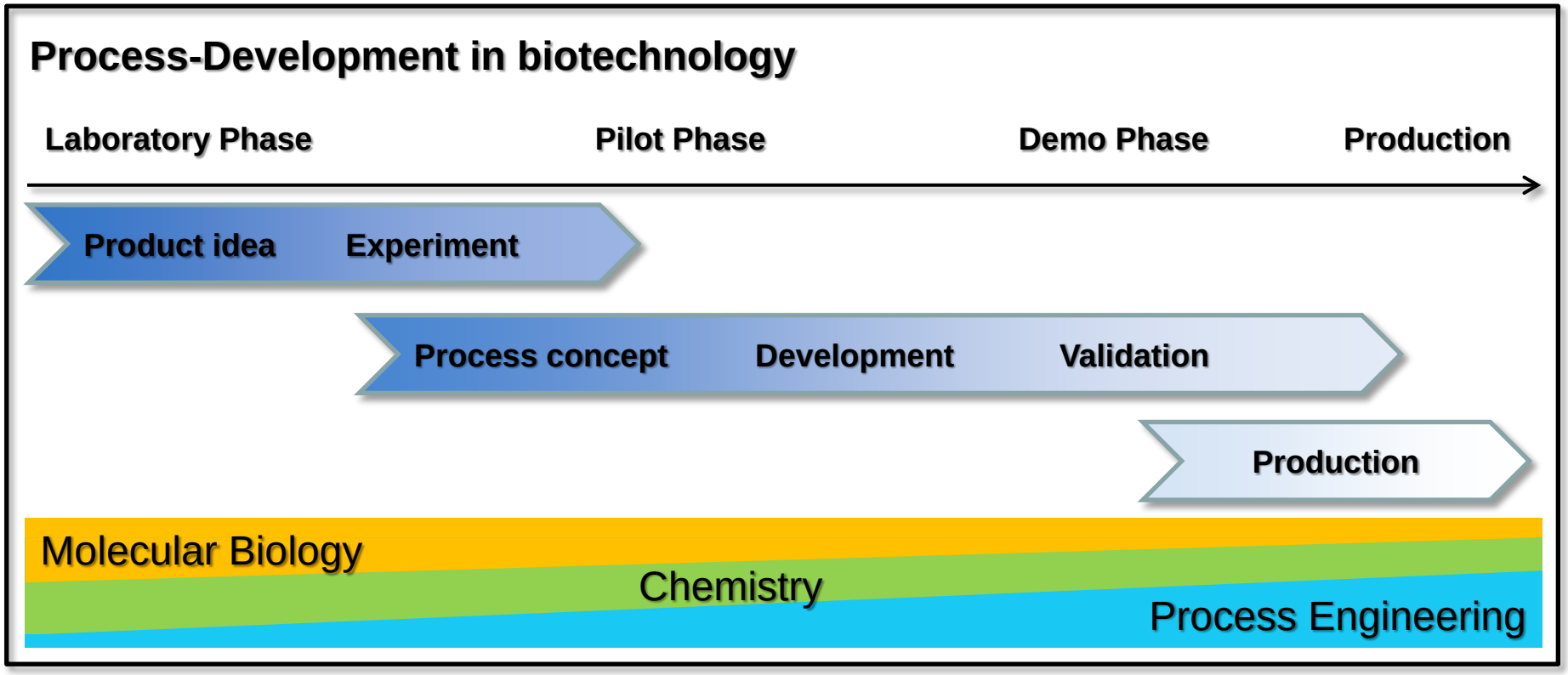


Informatik
Mathematik
Ingenieurwissenschaften
Physik
Chemie
Biowissenschaften
Wirtschaftswissenschaften

Study Course Chemical Biotechnology

– Education for the entire process chain

Interdisciplinary in itself: Tripartite focus



What do we expect from our graduates?

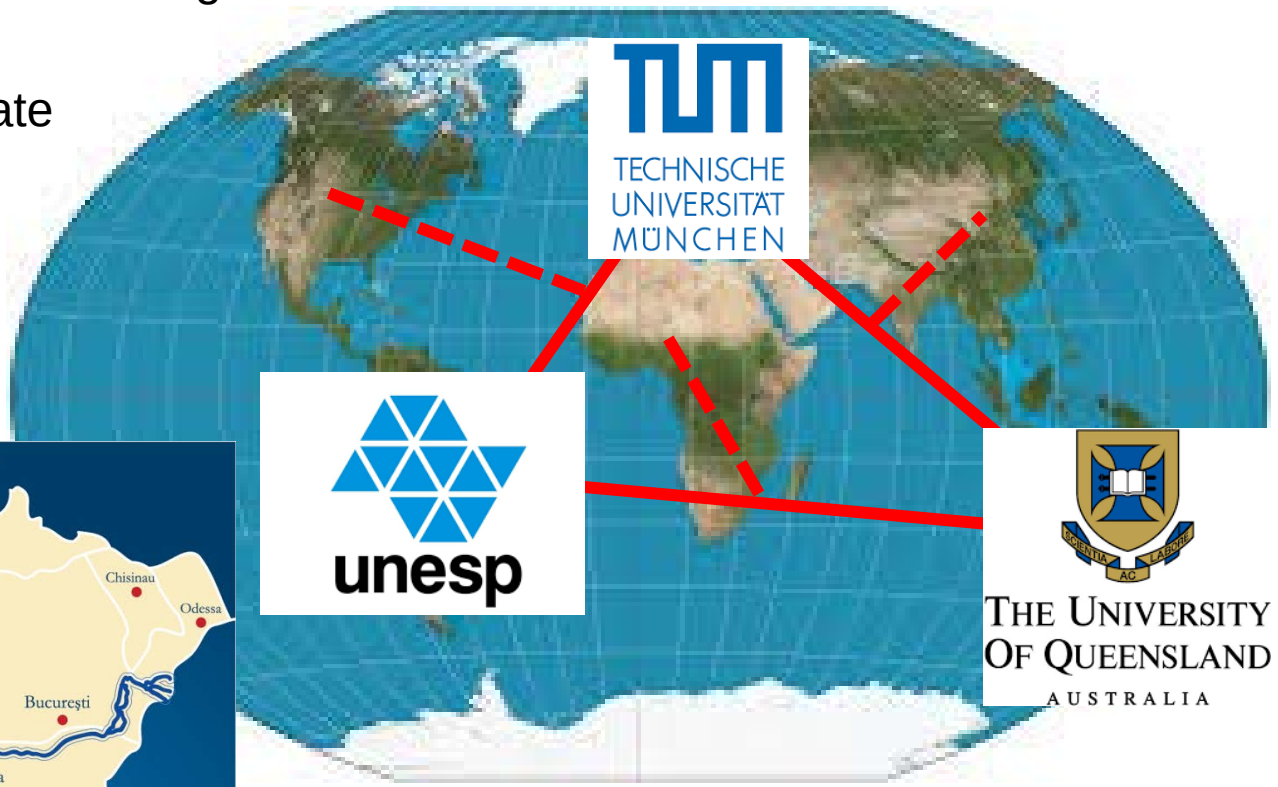
Learn from nature/biology!
Think like a chemist!
Act as an engineer!

Internationalisation is important

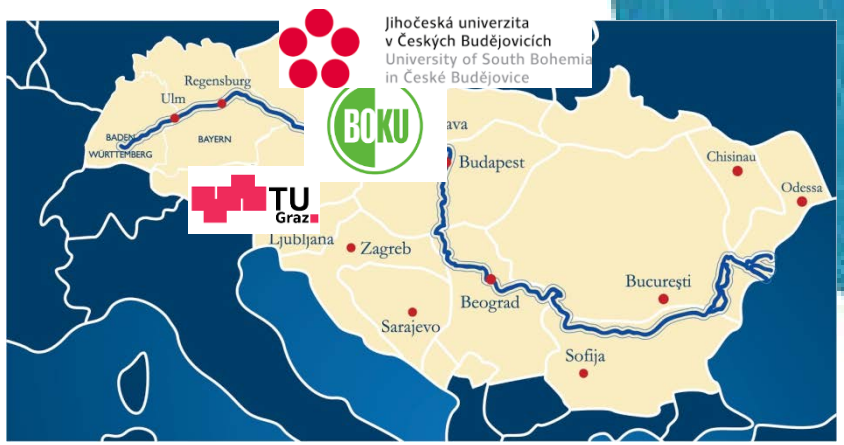
GLOBAL BIOECONOMY ALLIANCE

http://bioeconomy.world/

- Provide a network for student exchange
- Transfer knowledge and technologies
- Joint graduate programs for linking young professionals
- Joint projects to accelerate research progress



Europaregion | Evropský region
Donau Dunaj
Moldau Vltava



Student involvement

Help to establish working groups!

Employer involvement

SustainabilityDialogue@TUM … Platform for discussion with companies

Quality Mangement Circles of TUM … Experts from industry and others to evaluate and refine study courses

Building a bioeconomy education

Key Learnings

1. Bring the relevant people (lecturers, scientists and students) under one roof (a real one, not a virtual one)
2. Construct strong ties to the disciplines (Schools & deparments)
3. Build dedicated study programs instead of just doing cosmetic changes to existing programs
4. Build study programs with strong foundation in one discipline but with high content of other disciplines
5. Reach out to international partners
6. Involve employers
7. Get students involved

https://www.cs.tum.de/