



ERIFORE

European Research Infrastructure
for Circular Forest Bioeconomy



This project is funded by
The European Union

Education and training in forest bioeconomy in Europe

Tapani Vuorinen, Aalto University

Contents

- Forest bioeconomy education by ERIFORE partner universities, KTH and Aalto
- Overview on forest bioeconomy education in European countries
- Forest bioeconomy networks of HEIs and other stakeholders on national level
- Forest bioeconomy networks of HEIs and other stakeholders on European level
- Surveys on future competence needs
- Conclusions

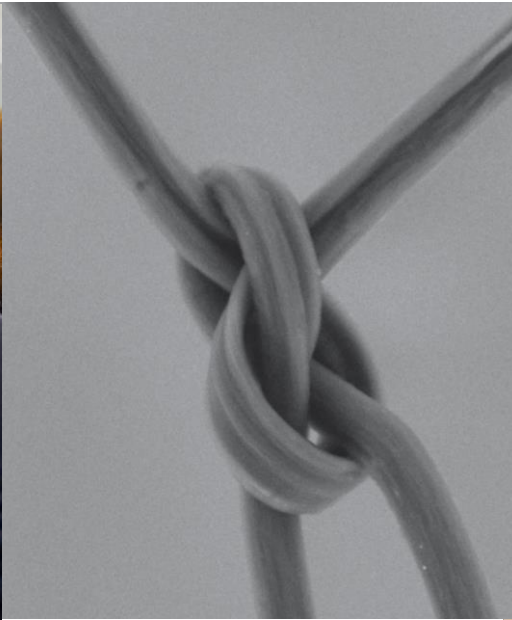


KTH Royal Institute of Technology

Stockholm, Sweden

AREAS OF STRENGTH: ENERGY , MATERIALS and MOLECULES
EDUCATION AND RESEARCH IN CLOSE CONTACT

BACHELOR, MASTER and PHD LEVEL





KTH Royal Institute of Technology

Master programmes (int./nat.)

Int. Master, 120 ECTS, eng.

Macromolecular Materials

Courses: Pulp and Paper; Fibre Technology - Natural and Synthetic Fibres; Bio Fibre Chemistry; Glycobiology and Carbohydrate Technology; Surfaces, Colloids and Soft Matter; Biopolymers; Materials: Structure and Properties; Chemistry of a Biorefinery; Biocomposite Materials.

Chemical Engineering for Energy and the Environment

Polymer technology

Joint Nordic Five Tech programme,
Double degree

Industrial and Environmental Biotechnology

National master programmes (300 ECTS, swe/eng.)

Technical Chemistry, Material Design, Biotechnology

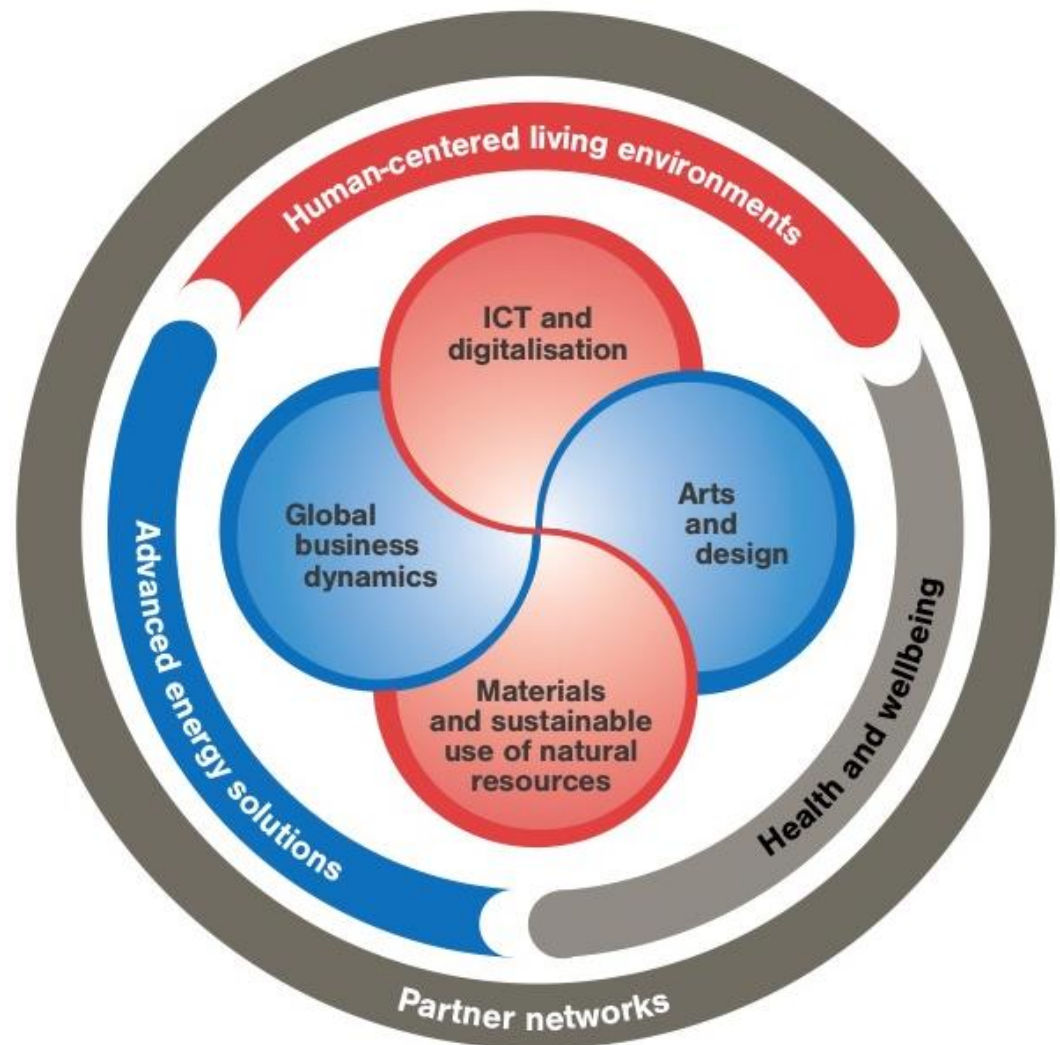




The way forward

Aalto University's research is based on *four key research areas* and *three integrative multidisciplinary themes* addressing major global and national challenges.

Our positive impact on *societal and industrial development* relies on interactive networks with our partners and collaborators.

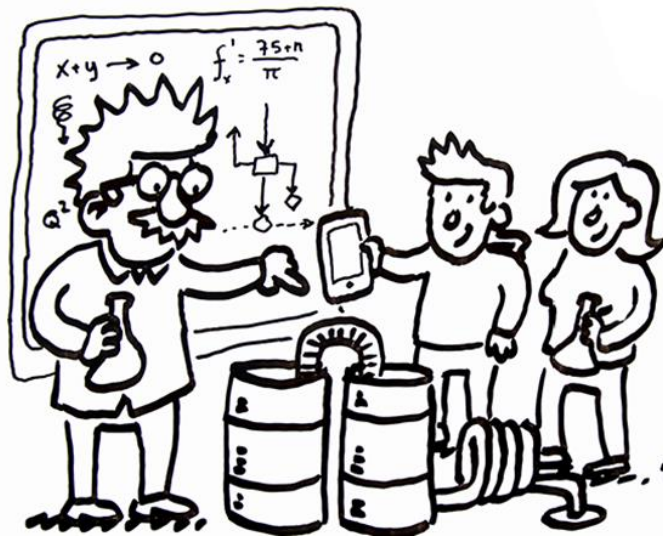


Educational programmes

- **Master's Programme in Chemical, Biochemical and Materials Engineering**
 - Biomass refining
 - Fiber and polymer engineering
 - Biotechnology
 - Chemical and process engineering
- **Master's Programme in Advanced Energy Solutions**
 - Industrial energy processes and sustainability
- **Nordic Master in Polymer Technology**
- **Environmental Pathways for Sustainable Energy Systems (SELECT)**
- **Wood Program (1 year programme)**
- **PackAge (minor)**
- **ChemArts (minor)**

Forest bioeconomy education in Europe

- Forestry and wood technology are well represented in European universities
- Only few countries, including Austria, Finland, France, Germany, Portugal and Sweden, can offer well-organized teaching, based on own scientific research, in all aspects of forest bioeconomy
- The link between forestry and the use of biomass is often lacking



Forest bioeconomy networks of HEIs and other stakeholders on national level

- Finland: Joined research programmes under CLIC Innovation Ltd. (companies, RIs and HEIs), National Bioeconomy Infrastructure (Aalto and VTT)
- Sweden: Wallenberg Wood Science Center (KTH and Chalmers)
- Austria: Joined research programmes under Wood K Plus

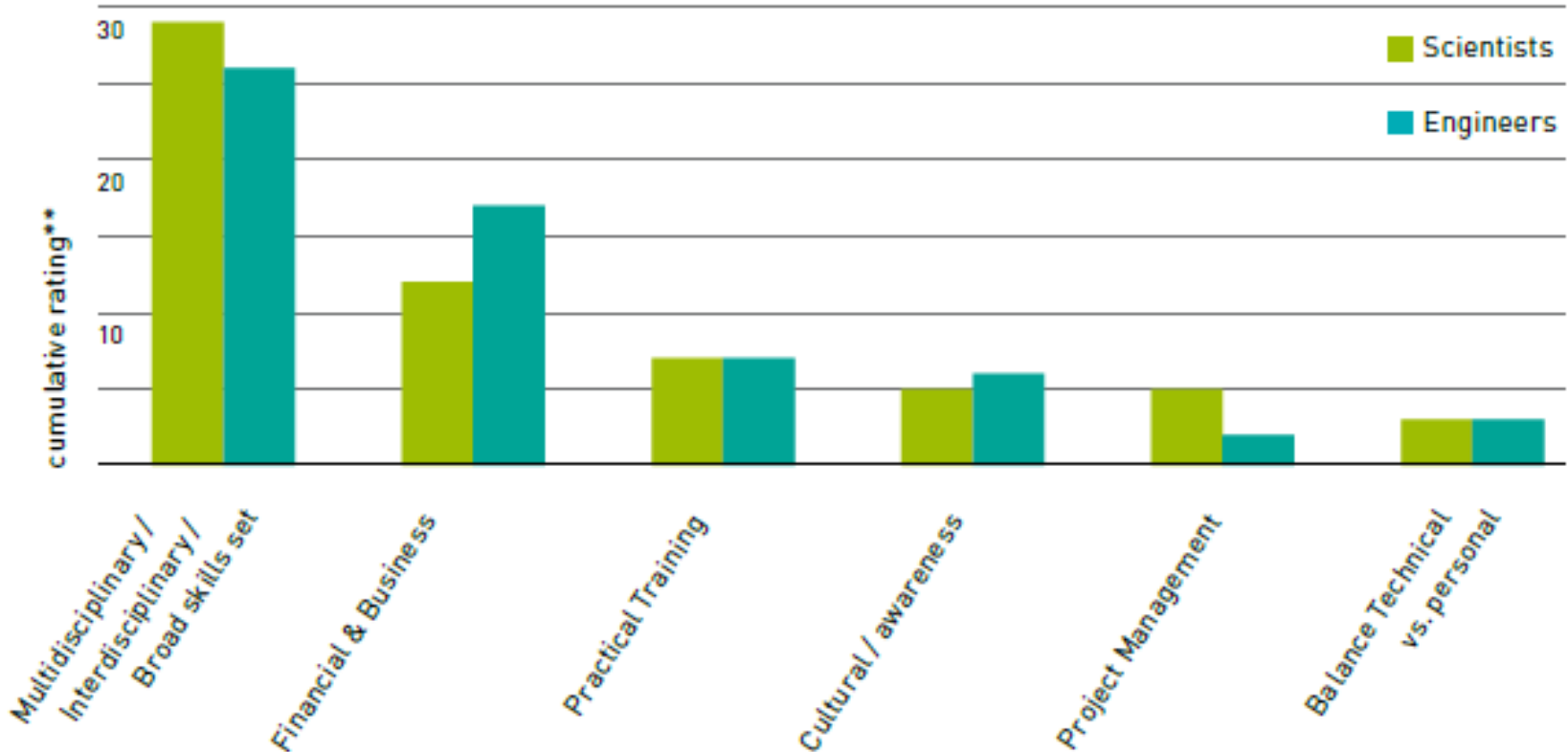


Forest bioeconomy networks of HEIs and other stakeholders on European level

- European Technology Platforms (FTP, SusChem)
 - National contact groups
- Global/European research organization networks
 - International Union of Forest Research Organizations (IUFRO)
 - European Fiber and Paper Research Organization (EFPRO)
- University alliances, e.g. Cluster and Nordic Five Tech
- EIT KICs
 - Energy, Climate
- Few Erasmus programmes on specific fields, mainly in forestry
- COST and ITN actions on specific topics
- Collaboration through joined research programs
- Open university, MOOCs

Needs identified by chemical industry

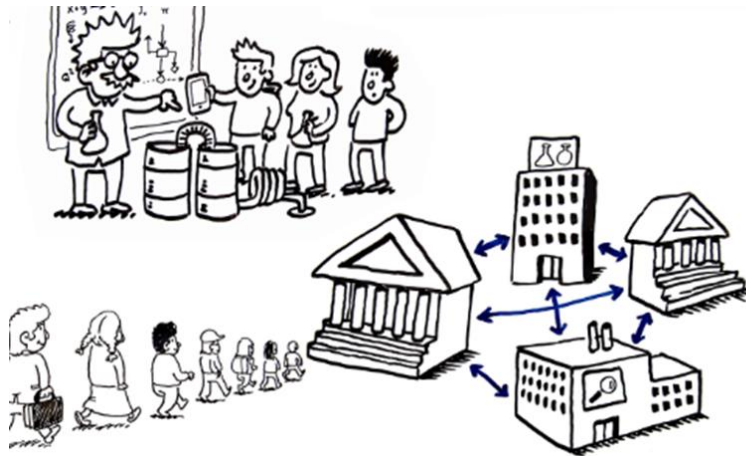
To be further developed in higher education curricula



CEFIC: Skills for Innovation in the European Chemical Industry, November 2010. Available at: www.cefic.org/Policy-Centre/Industry-Policy/Skills-Needed-for-Innovation/-Publications--position-papers/

Conclusions and discussion

- European higher education in forest bioeconomy is scattered and only few countries can offer well-organized teaching in the whole area
- The gap between forestry and use of forest biomass is obvious in higher education
- Collaboration between HEIs and their stakeholders is often based on provisional or sporadic arrangements



Acknowledgement

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 654371.

Consortium:

