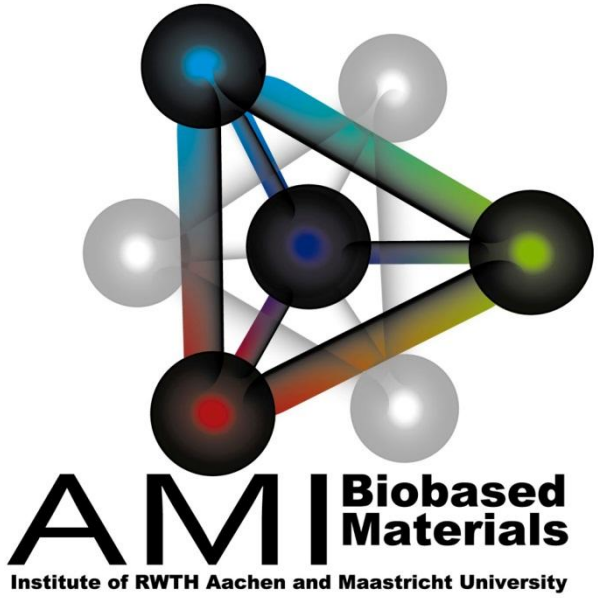


11 th ECRN Congress

24.10.2013

Gunnar Seide

Aachen-Maastricht Institute for Biobased Materials

Presented by:

RWTH AACHEN UNIVERSITY

Maastricht University

Content

- Motivation
- Organization
- Examples for research

Global production capacity of biopolymers

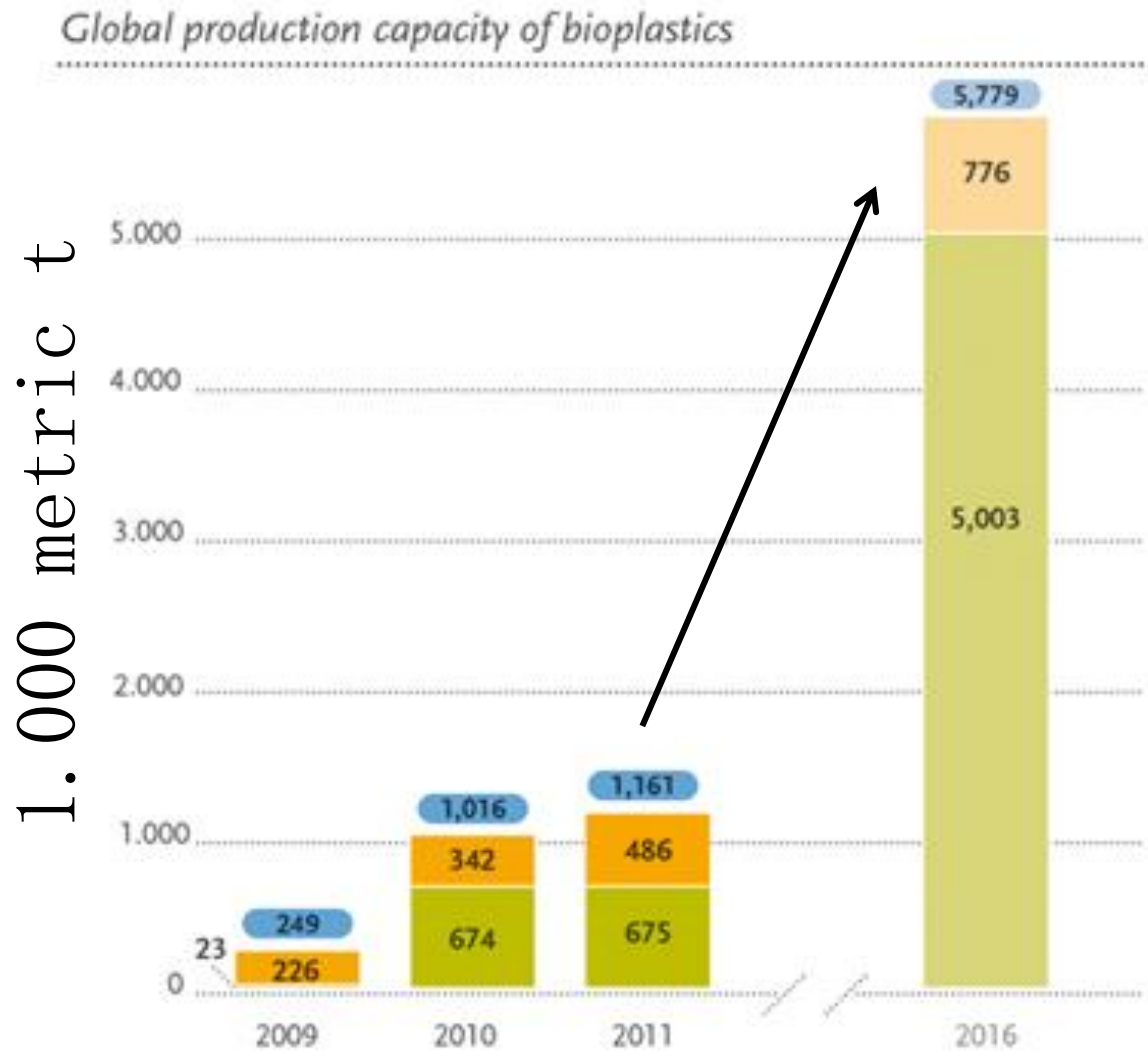
- Strong growth
  - Factor 4 in the next 5 yea

Total capacity

Biodegradable

Biobased/ non-biodegradable

Biopolymers are growing!



European Bioplastics 2012

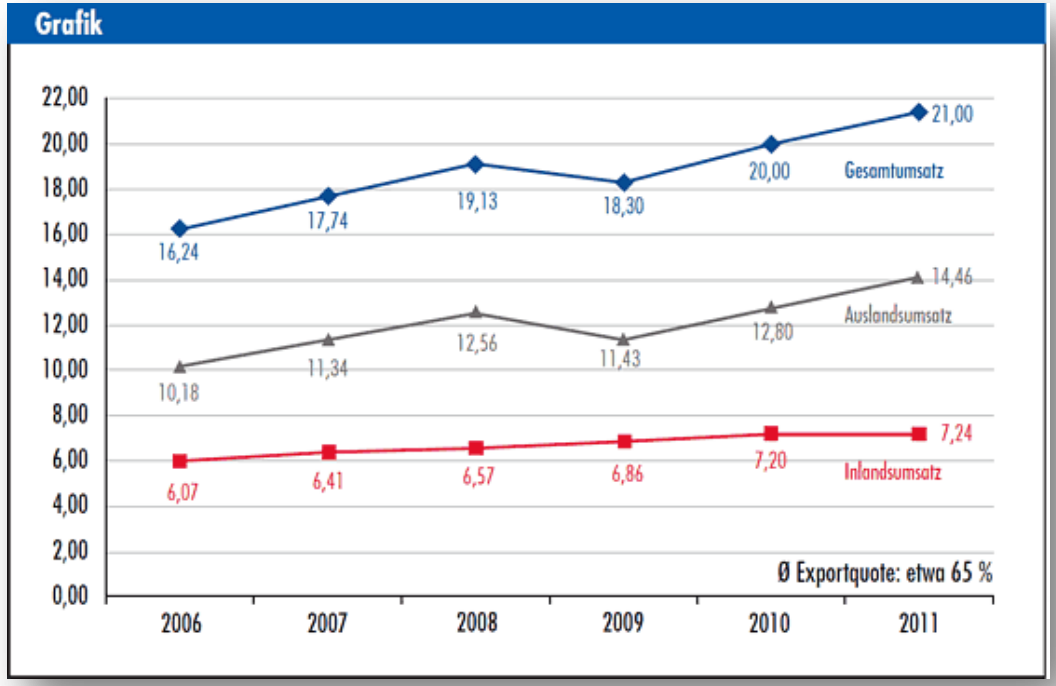
RWTH AACHEN UNIVERSITY

Maastricht University

Aachen Maastricht Institute of Biobased Materials

Biomedical Engineering (D)*

- Size of the market ~21 B €/a
- Worldwide market share 15%
- Foreign sales ~14.5 B €/a
- Large proportion of SMEs
- >70,000 employees (growing)
- 30% of turnover with products less than 3 years old
- 10% RTD of total budget



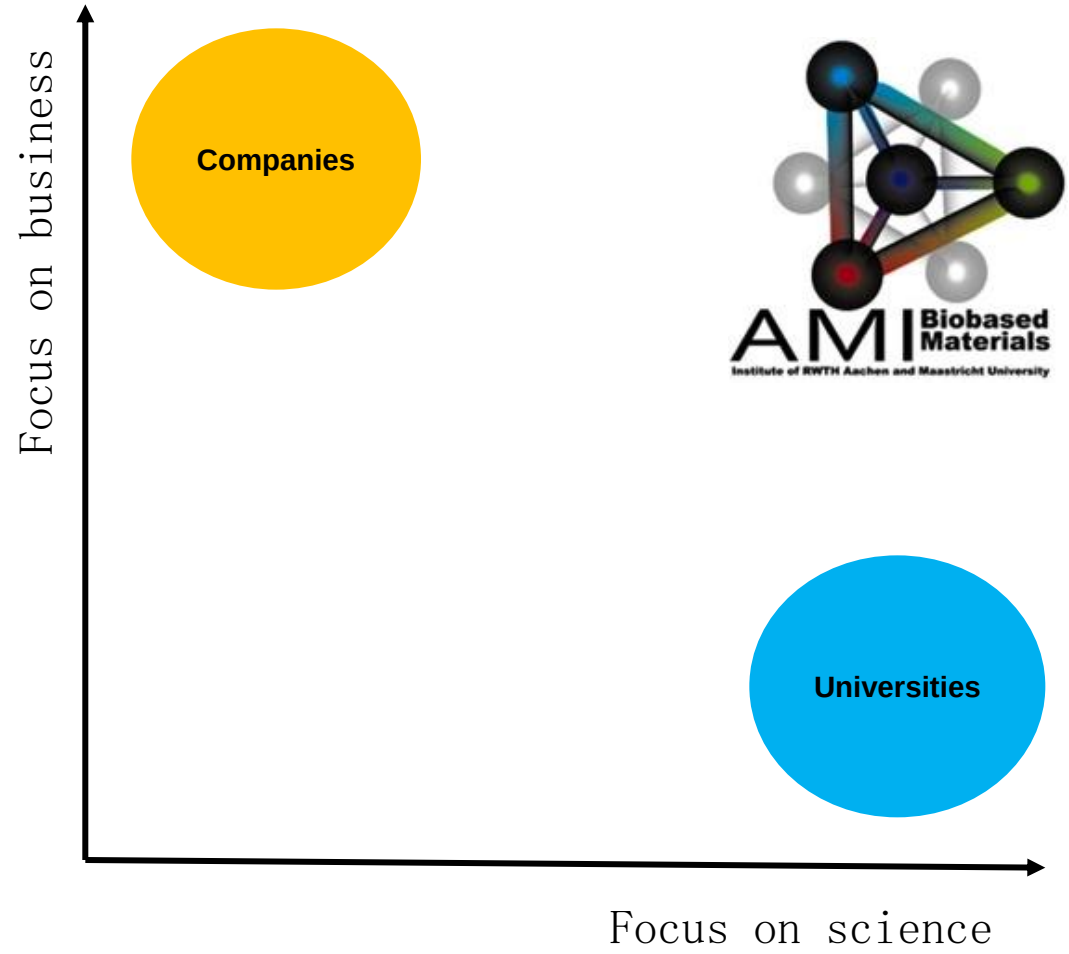
* BVMed Branchenbericht Medizintechnologie 2012

Medical innovation is strongly linked to innovative

Central aspects of the AMIBM concept

Focus

- AMIBM provides the ideal combination of scientific and commercial focus
- This maximizes scientific innovation in a business environment



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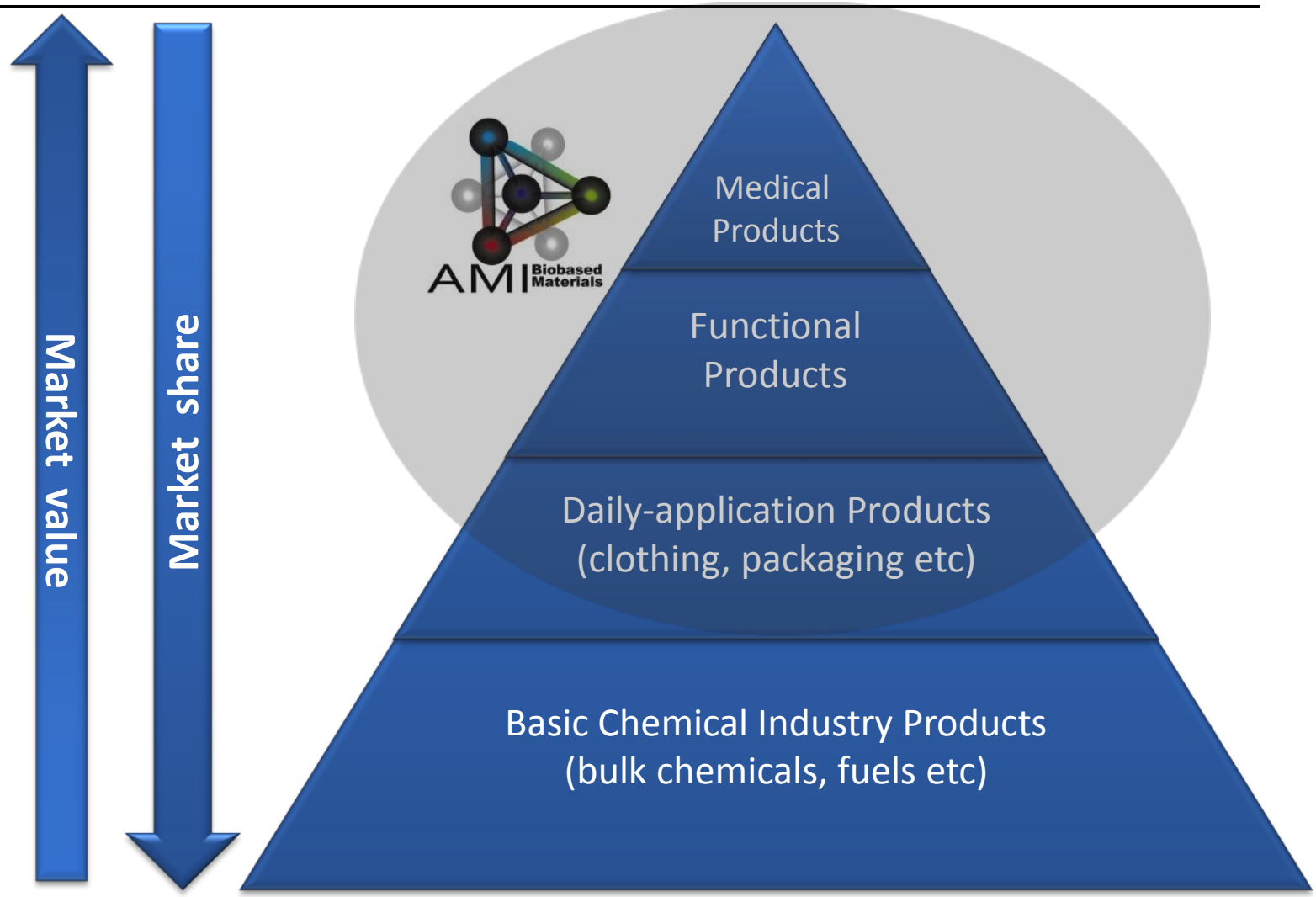
Focus of AMIBM



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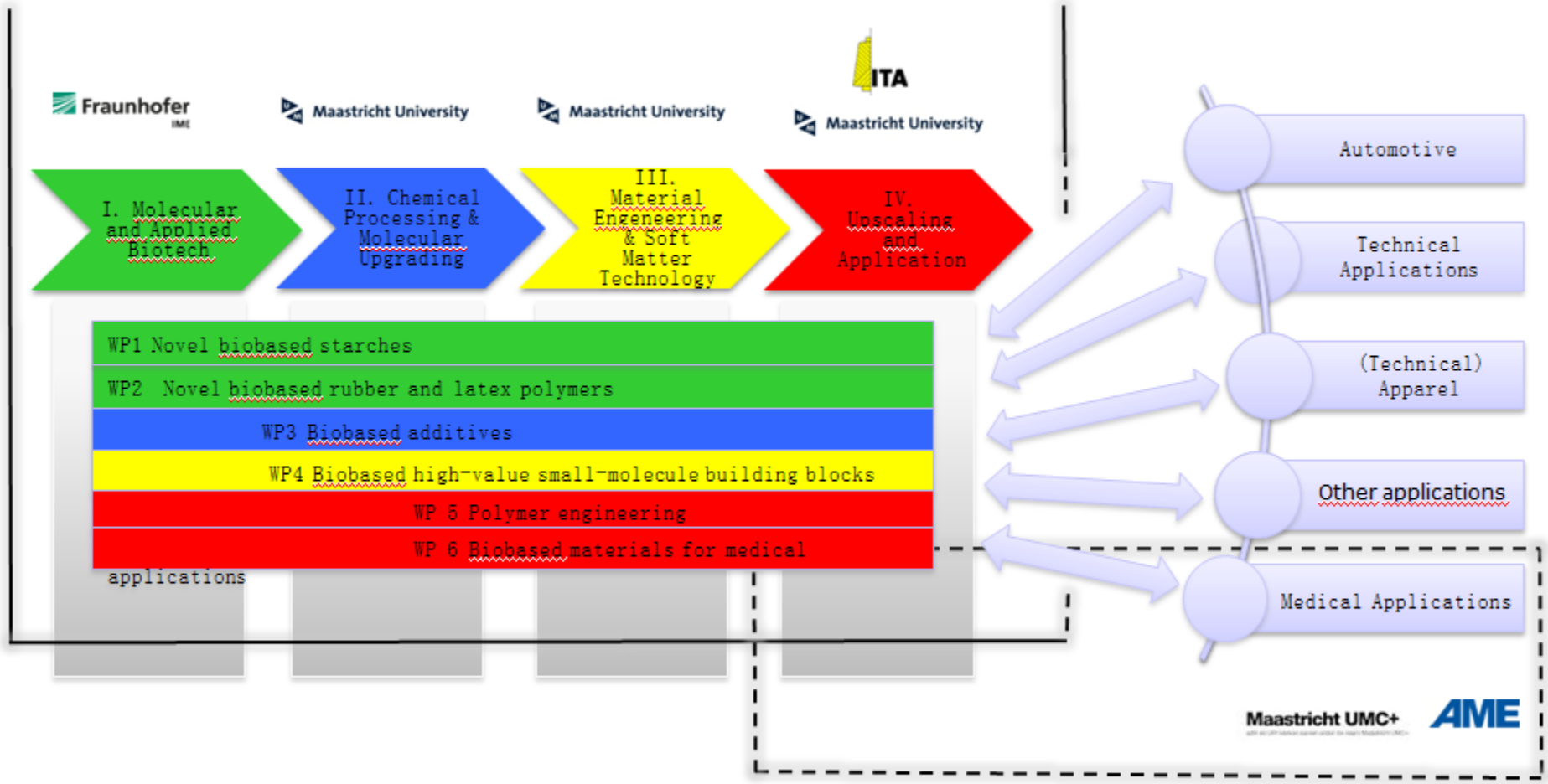
Four colums – AMIBM research activities



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AMIBM is part of the Limburg knowledge axis

Biobased
Sustainable
Healthy living

Agriculture
Food/feed

→ Venlo
GreenPort

Materials
Chemicals

→ Chemelot
Campus

Medical
applications

→ UM/RWTH/IME
Maastricht Health Campus
MUMC+

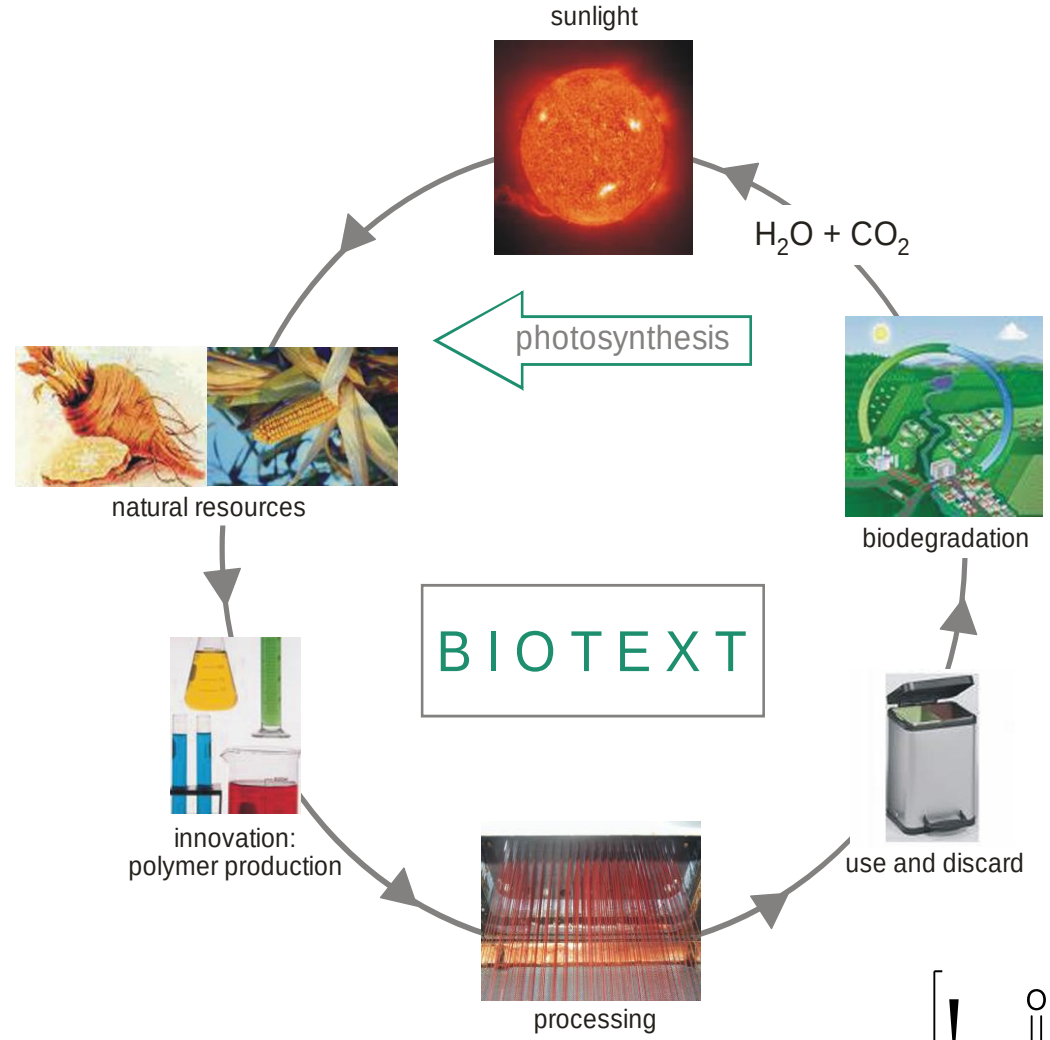
Content

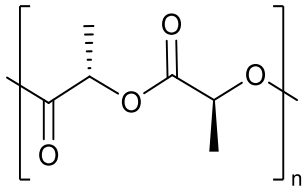
- Motivation
- Organization
- Approach
- **Examples for research**

Biobased Textiles

BIOTEXT – ERANET CORNET

- Evaluation of the potentials of new biopolymer formulations for application in textile extrusion processes





poly(lactide)
(PLA)

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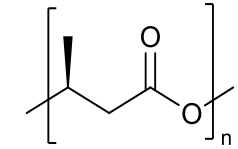
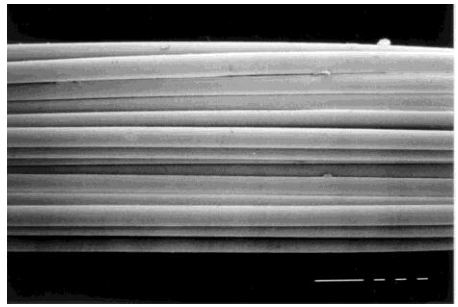
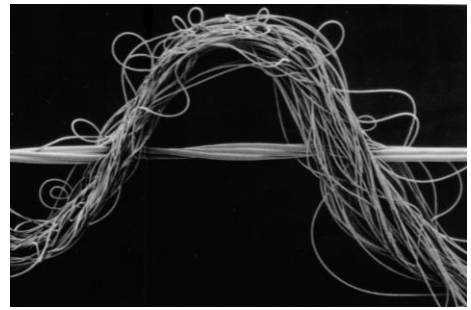


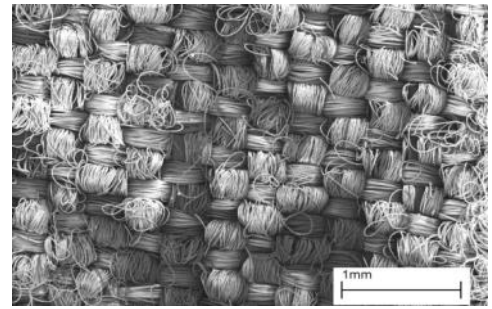
poly(hydroxybutyrate)
(PHB)

Biobased Textiles

Polymer → Melt spinning → Yarn processing → Fabric manufacturing







- Long and complex production chains in textile industry
- New materials often need development of new production technologies
- Example: “Green T-Shirt”

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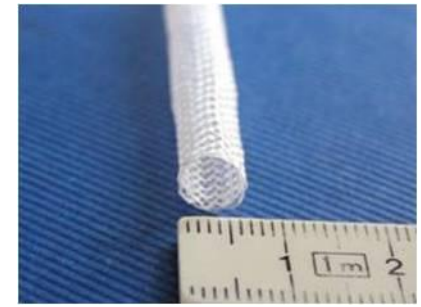
Medical Applications

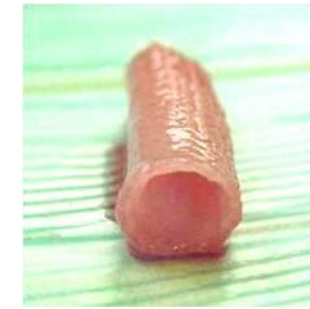
Vascular composite graft based on a textile PLA scaffold

EU-funded BioSys Project

Motivation:

- Synthetic grafts have unsatisfactory patency rates especially for small calibre vessels < 6 mm
- Autologous grafts have a limited availability



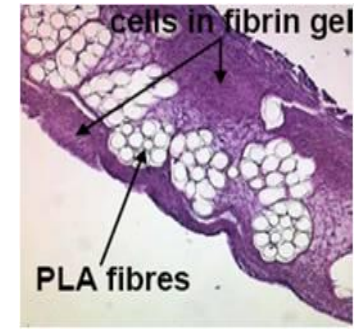


Macro porous structure TE composite graft

Goal:

- A minimal use of foreign body material
- Optimal mechanical properties
- With the advantages of viable tissue

  Methods: Tissue engineered composite graft
- Macroporous PLA mesh for mechanical strength
- Autologous fibrin gel as cell carrier



Histological staining

Implanted vascular composite graft

source: AME

APPLIED MEDICAL ENGINEERING

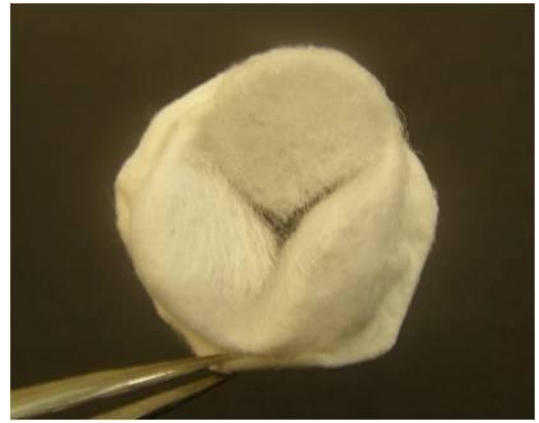
UniversitätsSpital Zürich

National University of Ireland, Galway
Ollscoil na hÉireann, Gaillimh

TAMPERE UNIVERSITY OF TECHNOLOGY

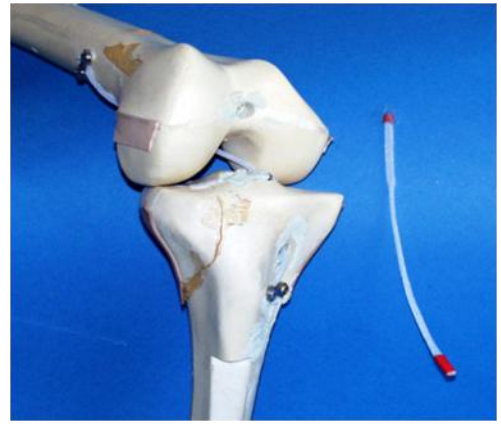
Medical Applications

- 2D- and 3D-geometries
- Adapted mechanical properties
- Drapeable
- Adapted macro- and micro-structure
- High specific surface
- Biocompatible materials and combinations
- Adjustable degradation

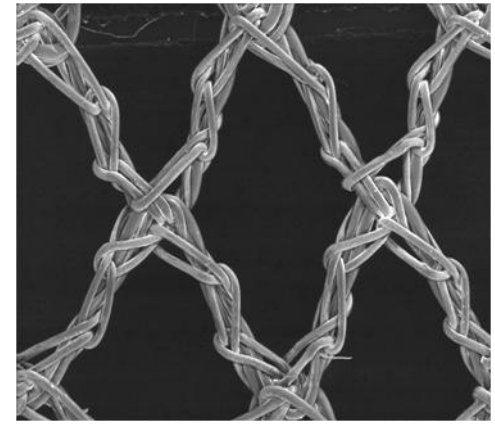


Heart-Valve Scaffold

Shape-Memory Braid



Braided ligament

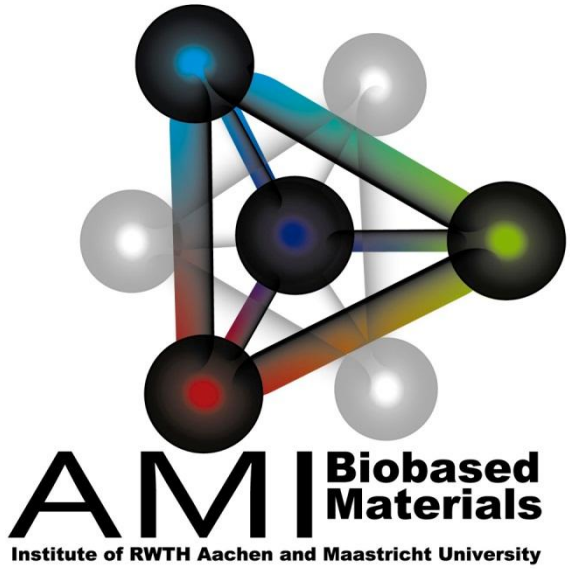


Hernia mesh

Aachen Maastricht Institute of Biobased Materials

- Innovative (bio)materials will enable innovative medical and technical products
- AMI-Biobased Materials offers a unique opportunity for biobased solutions
- Bridging the gap between lab and production
- Clear focus on translation to market:

"from molecular science to clinical and technical application"



Contact:

Aachen-Maastricht Institute for Biobased Materials
Institute of RWTH Aachen and Maastricht University

Chemelot Campus
Urmonderbaan 22
6167 RD Geleen

Room 110.2.004
Phone: +49-241-6085-12010 Mail: info@amibm.org

http://www.amibm.org

Tank you very much for your attention!

gunnar.seide@ita.rwth-aachen.de

RWTH AACHEN UNIVERSITY Maastricht University