

Master Biobased Materials

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In this presentation

- Background Biobased Materials and our master
- Curriculum information
- Location: Brightlands Chemelot campus
- Admission requirements & procedure

Biobased Materials

- Biobased materials: connected to global/scientific challenges

Depletion fossil resources



Waste & Environment



Toxicity & Microplastics



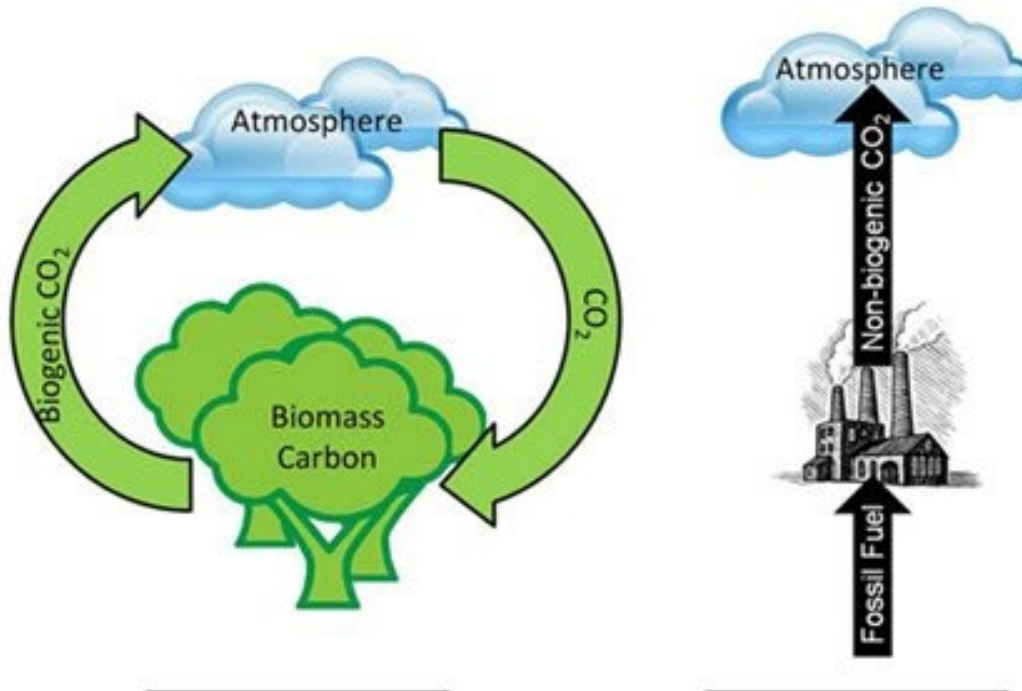
Global warming



Sustainability



Photosynthesis as the basis of all biomass



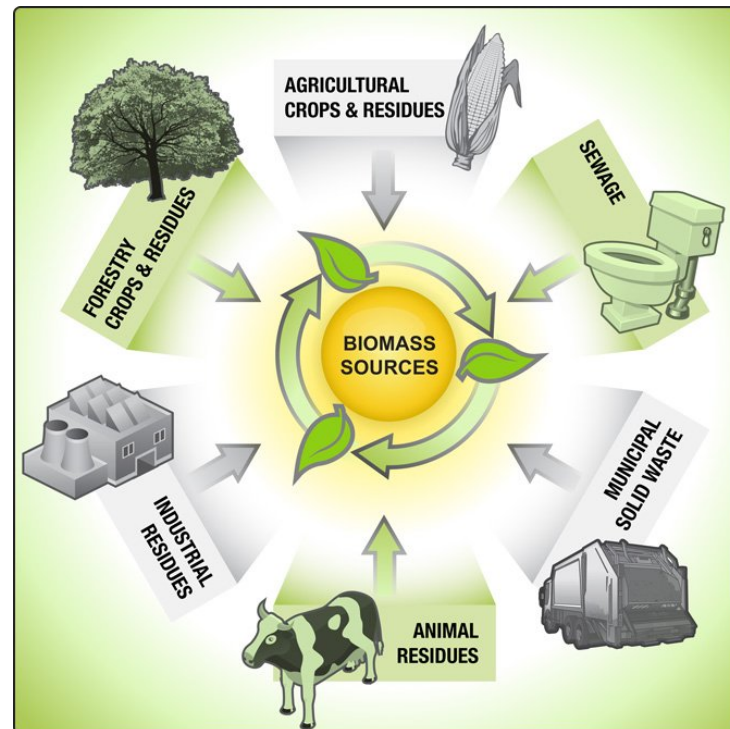
Biogenic carbon is part of a relatively rapid natural cycle that impacts atmospheric CO₂ only if the cycle is out of balance.

Fossil fuel combustion transfers geologic carbon into the atmosphere. It is a one-way process.

Biobased Materials are:

- Materials (partly) made from biological components
- Made from biomass; from renewable biological feed-stocks
- Aimed to contribute to the transition towards a sustainable economy

Biomass →



Biobased Materials: examples



Starch-based
packing peanuts



Biobased
Poly-ethylene



Poly-lactic acid
Biomedical implants

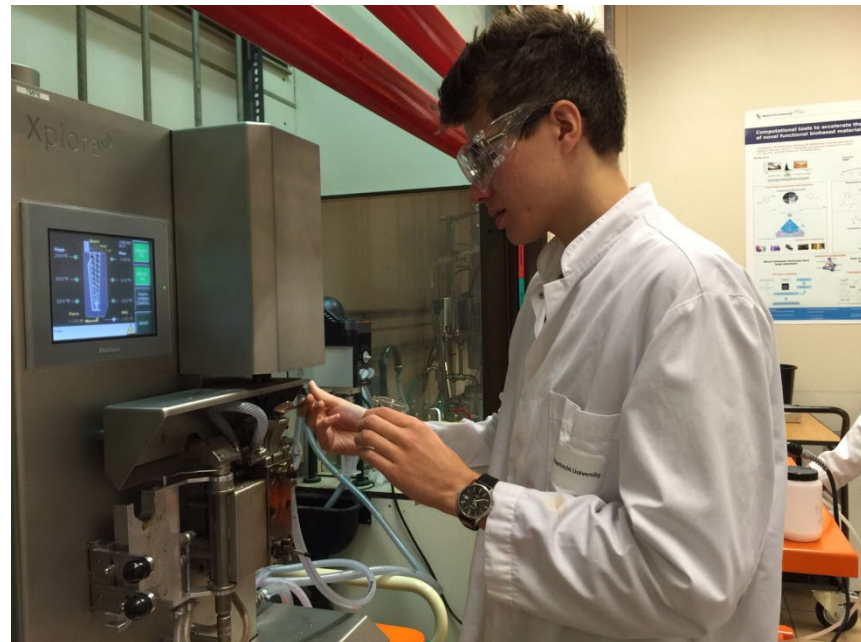
Scientific challenges for the future:

- are multidisciplinary and international
- need teams spanning several scientific disciplines to develop solutions
- require new scientists
 - new teaching programmes



New scientists → need for students:

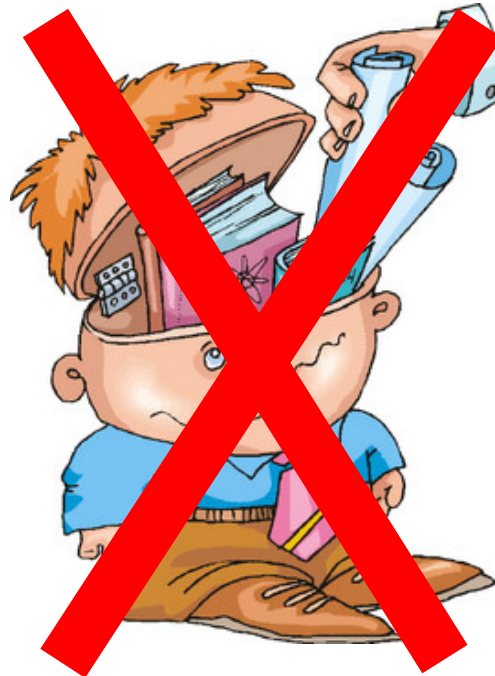
- who have a broad interest in materials science, focused on biobased & sustainable alternatives
- who do not want to be limited to a fixed, highly specialised programme
- who want to learn how to think, work and communicate across disciplines



“Mission statement”

The BBM-graduates should be(come) independent responsible scientists who have an attitude of curiosity-driven life-long learning.

They will be educated to work across different disciplines as specialists and/or bridge builders and support the development of the biobased economy by driving forward innovation through novel and creative research.



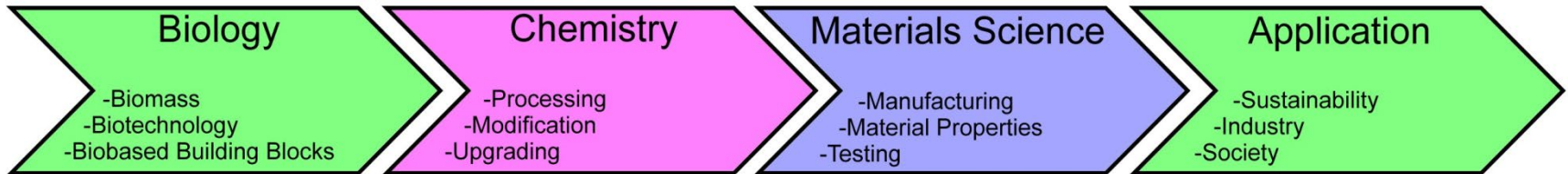
Master Biobased Materials

- Started 31 august 2015 with a select group of students
- 2 year, full-time master
- 120 ECTS
- At Chemelot campus (Geleen, NL)
- Fully taught in English



Curriculum set-up:

- Multidisciplinary programme: broad spectrum science topics spanning the development chain Biobased Materials

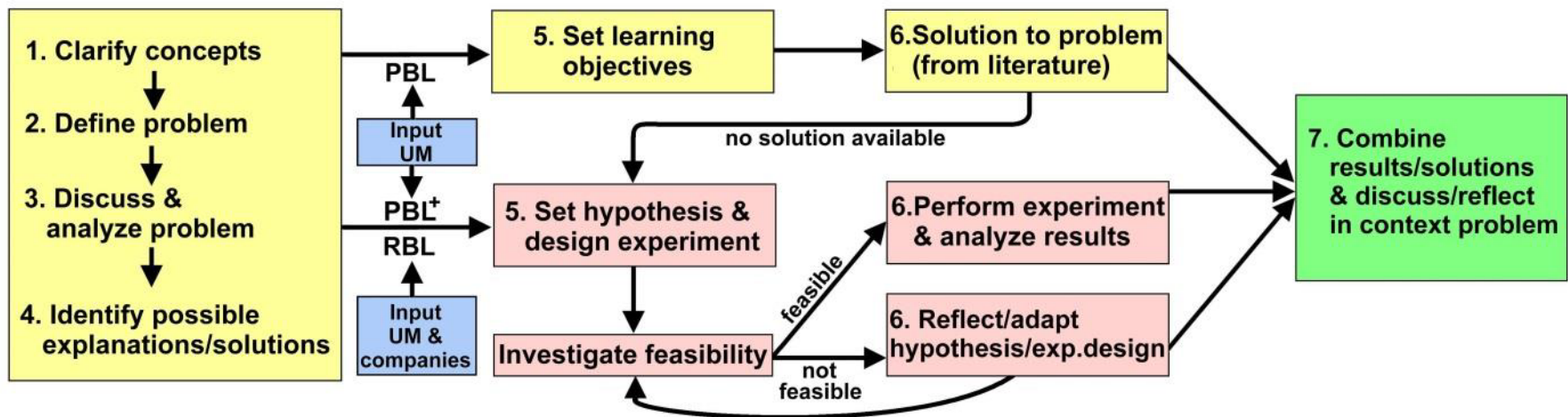


Curriculum characteristics:

- Flexible curriculum to emphasize individual needs, wishes and talents of students
- Use of Problem-Based Learning (PBL) and especially Research-Based Learning (RBL)
- Emphasis on problem solving and competence development
- Student-centered learning: high level of student involvement in programme → academic community
- High staff-student ratio: small scale education
- Teaching staff with industrial experience
- Input of local industry at Brightlands Chemelot campus

Research-Based-Learning environment

- Stimulate inquisitive attitude in students to improve creative and innovative thinking and working
- Connect companies to UM teaching:



Teaching modules:

- Courses: **8 weeks**; *two simultaneously/period*
using PBL/RBL; *lectures, tutor groups;*
practical skills (lab practicals) (10 hours /course/week)
- Projects: **4 weeks**;
Lab based research;
intergrating acquired knowledge & skills (≥ 3 days/week)
- Master thesis research project:
32 weeks (48 ECTS; October - June);
full-time at research group or institution of choice

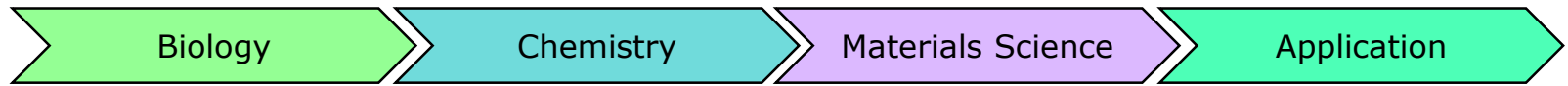
Programme Master BBM

- 1st year MSc Biobased Materials (total 60 EC)

8 weeks	8 weeks	4 weeks	8 weeks	8 weeks	4 weeks
Compulsory courses	Compulsory courses	Project	Electives	Electives	Project
		student research (group)	Choose 2 from 3	Choose 2 from 3	student research (group)
2 x 6 EC	2 x 6 EC	6 EC	2 x 6 EC	2 x 6 EC	6 EC

- 2nd year MSc Biobased Materials (total 60 EC)

8 weeks	32 weeks
Electives	Master Thesis Research Project
Choose 2 from 3	Individual student research project
2 x 6 EC	48 EC



P1 Biobased Materials
Process Technology

P2 Plant Derived Materials & Building blocks or Principles of Materials Science
Molecular Biology Physiology of Plants and Microbes

P3 Interdisciplinary research project

P4 Advanced Macromolecular Chemistry Applied Materials Science and Engineering Biomedical Materials

P5 Surfaces and Interfaces Nano-Science and Nao Technology Sustainability of Biobased Materials

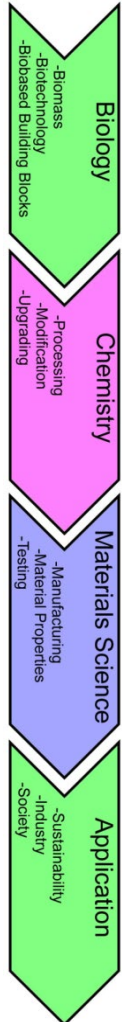
P6 Interdisciplinary research project

P1 Carbohydrates: Monomers and Polymers Materials Molecular Engineering Commercialization and Entrepreneurship

P2 - P6 Master Thesis Research Project

Elective courses (students choose 6 from 9)

- Advanced Macromolecular Chemistry: (Bio)polymers Synthesis, Modification And Characterization
- Applied Materials Science & Engineering
- Biomedical Materials: From Implants To Regenerative Medicine
- Carbohydrates: Monomers & Polymers
- Commercialization & Entrepreneurship
- Materials Molecular Engineering: Structure-function Relationships
- Nano-science & Nano-technology: Biopolymers & Biocomposites
- Sustainability Of Biobased Materials (→ Sustainable Society)
- Surfaces And Interfaces: Modification And Spectroscopical Analysis



Study load: What does a week of study look like?

Per 2 courses each week (up to 20 hr contact time)

<u>module</u>	<u>hr/module</u>	<u>total/week</u>
• 2 x 1 lecture per week	1.5-2 hr/lecture	3-4 hr
• 2 x 2 tutorials per week	1.5-2 hr/tutorial	6-8 hr
• Skills training: lab skills or academic skills	8 hr/session	8 hr
• Self study	20-24 hr/week	20-24 hr

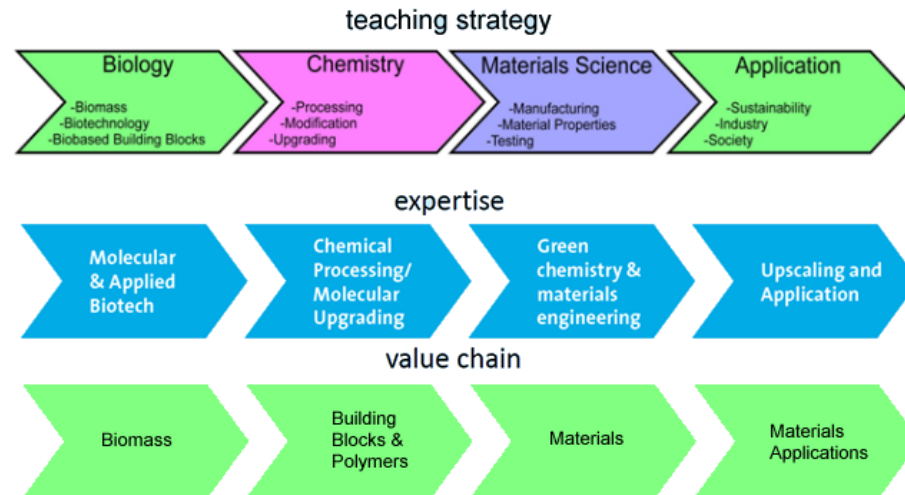
Brightlands Chemelot campus

- State-of-the-art infrastructure and facilities
- Direct contact with research groups working on biobased materials
 - university, research institutes and industry
- Clear focus on actual application of biobased materials
- Personal coaches from companies (or academia)
- Possibility to meet future employer on site
- Excellent learning environment connecting to needs of university, industry and society



Brightlands Chemelot campus

- UM Master Biobased Materials



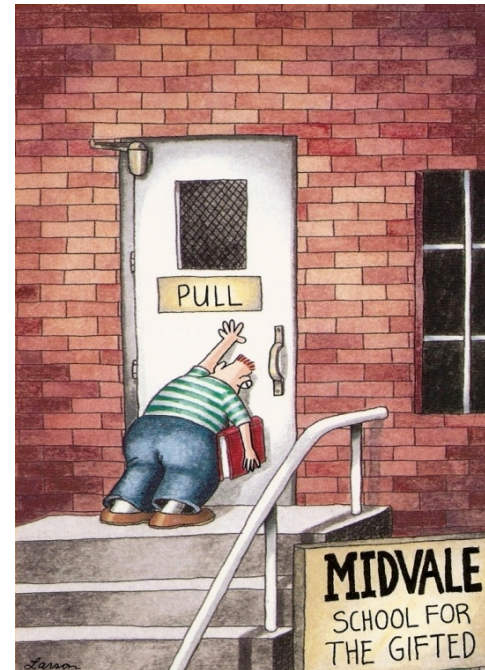
- Research

Aachen Maastricht Institute for Biobased Materials



Admission requirements:

- **Bachelor diploma:** sciences, chemistry, materials science, biotechnology, etc.
- Strongly recommended **10-15 ECTS (or equivalent)** in mathematics at bachelor level
- **Motivation** to study biobased materials
- Proficiency in the **English** language



Admission procedure:

- Send in **all documents**: bachelor diploma; transcripts or grade list; motivation letter; 2 reference letters; copy passport; english proficiency (IELTS, TOEFL, etc.)
- **Interview**: approx. 30 minutes to determine if there is a match between student and master programme
- Board of admissions makes a **decision** on admission



Meet our students

“Often I have to step outside of my own disciplines, but that is what really broadens horizons”

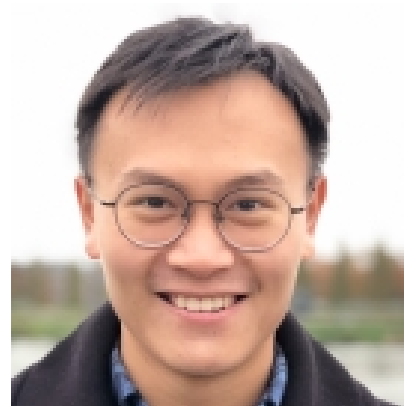
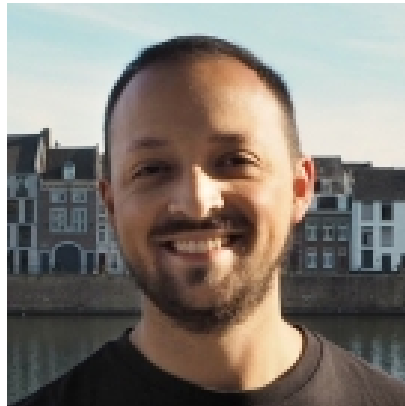
Johannes Berghaus, Germany, 1st year student



Meet our students

“I found this programme quite unique because it is multidisciplinary and its focus on using renewable resources to produce new materials with different applications.”

Bernal Garcia Lascurain, Mexico, 1st year student



“The programme has a good collaboration with the on-site industrial”

Hui Shen, China, 2nd year student

Contact/Information:

- E-mail: Bbm-info@maastrichtuniversity.nl
- Website: www.maastrichtuniversity.nl/biobasedmaterials
-  [/BiobasedMaterials](https://www.facebook.com/BiobasedMaterials)
-  [Science and Engineering Maastricht University](https://www.youtube.com/ScienceandEngineeringMaastrichtUniversity)



- Student for a day
It is possible to be a student for a day. [Just ask us about the possibilities](#) and we 'll make an appointment for you with one of our teachers to get more information about the programme and to see our facilities.