

Master Biobased Materials

Yvonne van der Meer
Associate professor -
Sustainability Assessment
24th March 2018

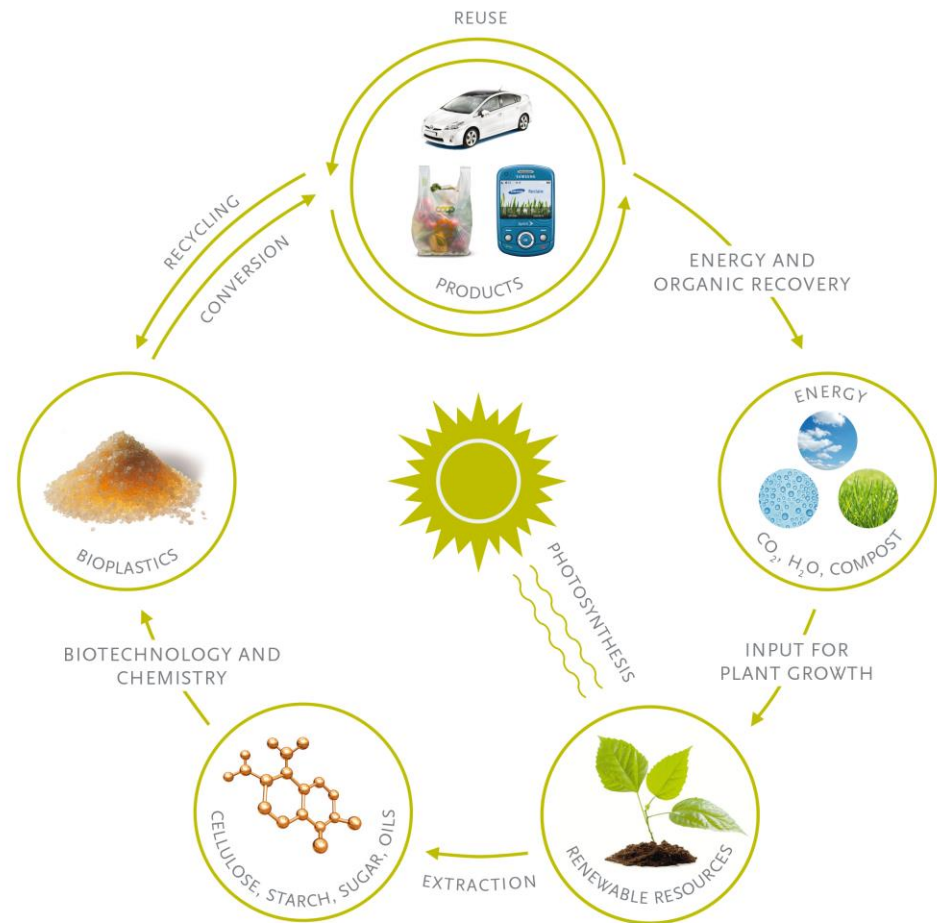


In this presentation

- Background Biobased Materials
- Curriculum information
- Location & partners - Brightlands Chemelot campus
- Admission requirements & procedure

Bio-based materials

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



Graph: Life cycle model
European Bioplastics

Biobased Materials: examples



Starch-based
packing peanuts



Biobased
Poly-ethylene

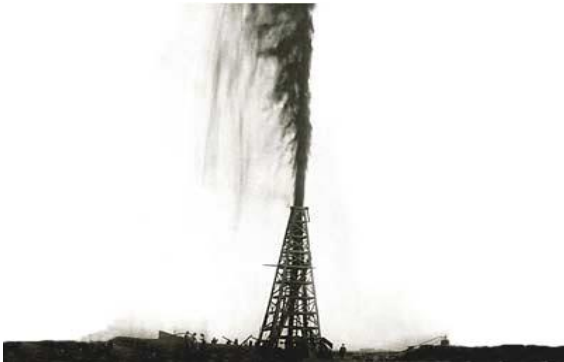


Poly-lactic acid
Biomedical implants

Biobased Materials

Biobased materials: connected to global/scientific challenges

Depletion fossil resources



Toxicity & microplastics



Waste & environment



Global warming



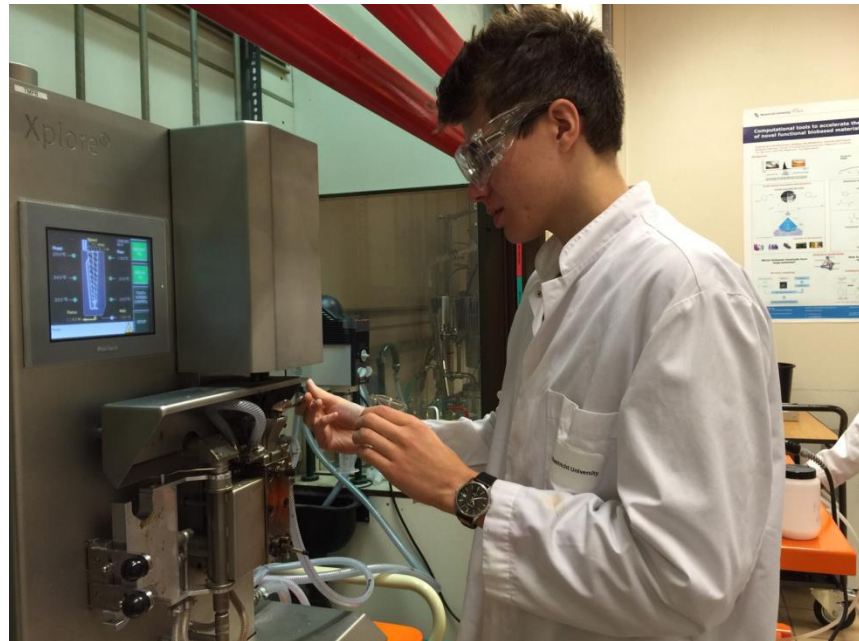
Scientific challenges for the future

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



New scientists - need for students

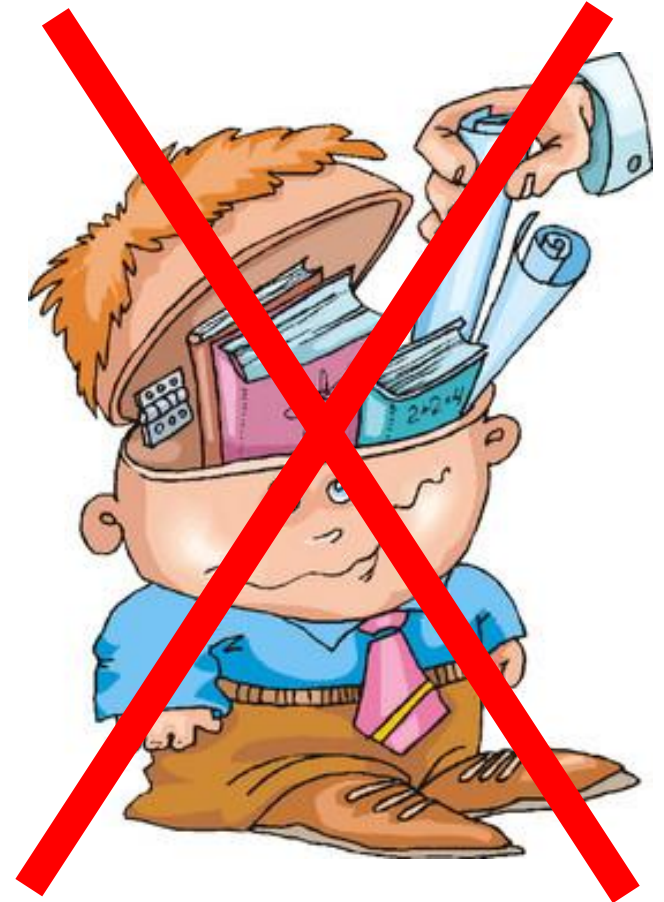
- who have a broad interest in materials science, focused on biobased & sustainable alternatives
- who do not want to be limited to a fixed, highly specialised programme
- who want to learn how to think, work and communicate across disciplines



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

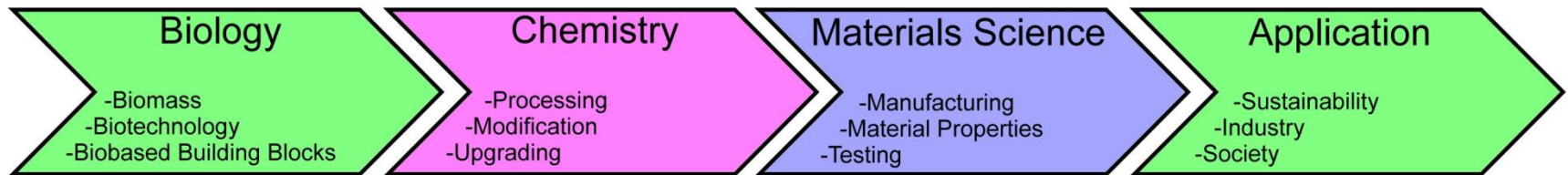
Started 31 august 2015; 2018-2019 will be fourth program edition

- 2 year, full-time master
- 120 ECTS
- At Brightlands 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

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);
fulltime at research group or institution of choice

Programme Master BBM

1st year MSc Biobased Materials (total 60 EC)

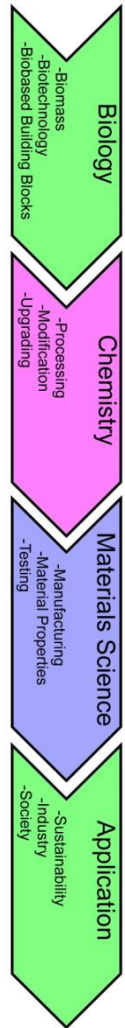
8 weeks	8 weeks	4 weeks	8 weeks	8 weeks	4 weeks
Compulsory courses	Compulsory courses	Project	Electives	Electives	Project
1) Biobased Materials 2) Molecular Biology* or 2) Materials Science*	1) Bio-organic chemistry 2) Process technology	student research (group)	Choose 2 from 4	Choose 2 from 4	student 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)

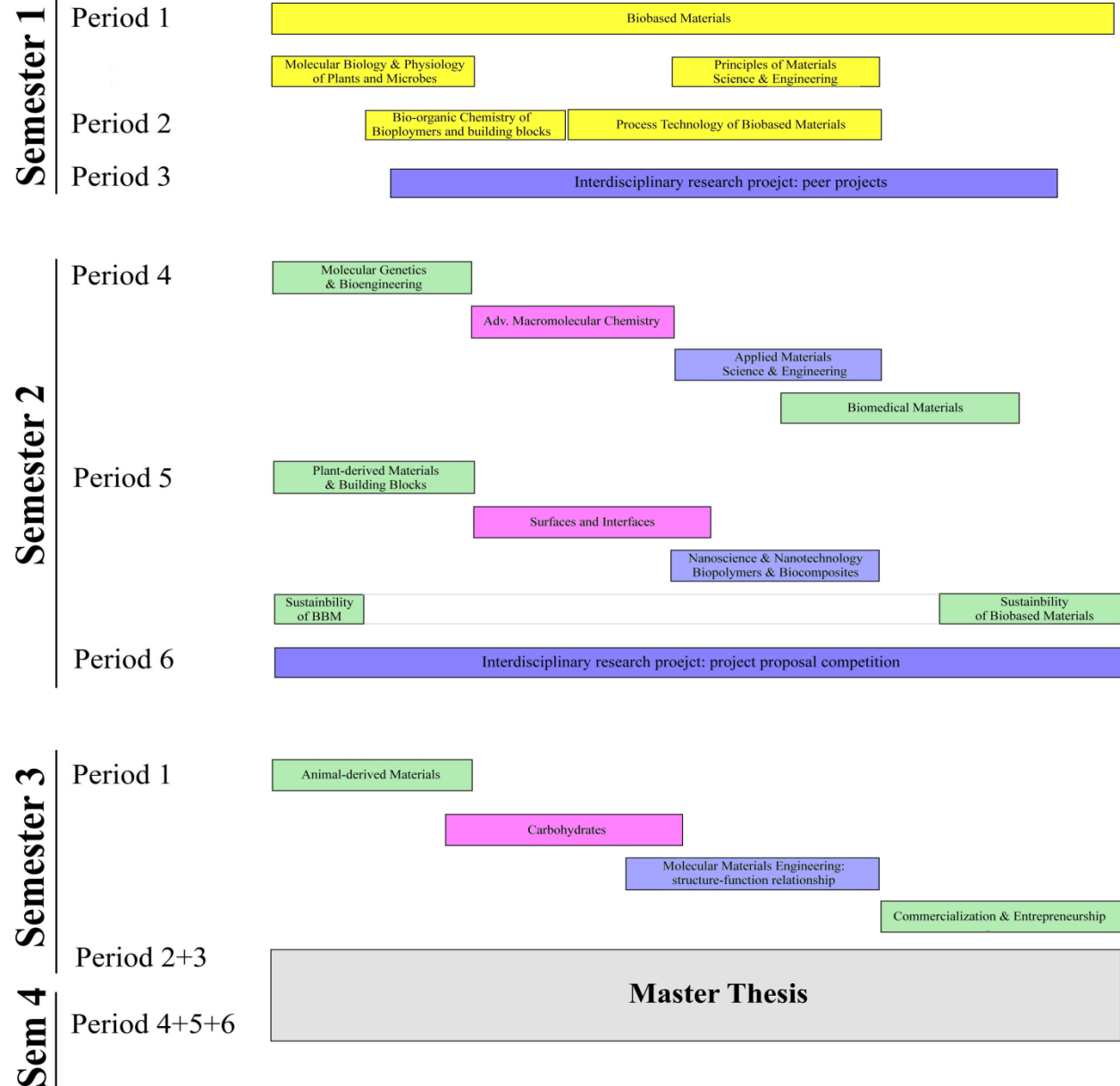
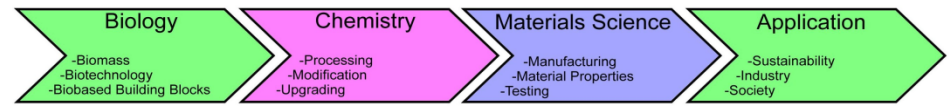
8 weeks	32 weeks
Electives	Master Thesis Research Project
Choose 2 from 4	Individual student research project
2 x 6 EC	48 EC

Elective courses (*students choose 6 from 12*)

- Molecular genetics and bio-engineering (of plants and microbes + biotechnology)
- Animal derived Materials
- Plant derived materials & building blocks
- Carbohydrates: monomers & polymers
- Advanced Macromolecular Chemistry: (Bio)polymers synthesis, modification and characterization
- Surfaces and Interfaces: modification and spectroscopical analysis
- Applied Materials Science & Engineering
- Nano-science & nano-technology: Biopolymers & Biocomposites
- Materials Molecular Engineering: structure-function relationships
- Biomedical Materials: from implants to regenerative medicine
- Sustainability of Biobased Materials (→ sustainable society)
- Commercialization & Entrepreneurship



Curriculum overview





Study load

what does a week of study look like?

module	hr/module	total/week
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 / 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
- Possibility to meet future employer on site
- Excellent learning environment connecting to needs of university, industry and society



Connection to other campus residents

External expert input in teaching from

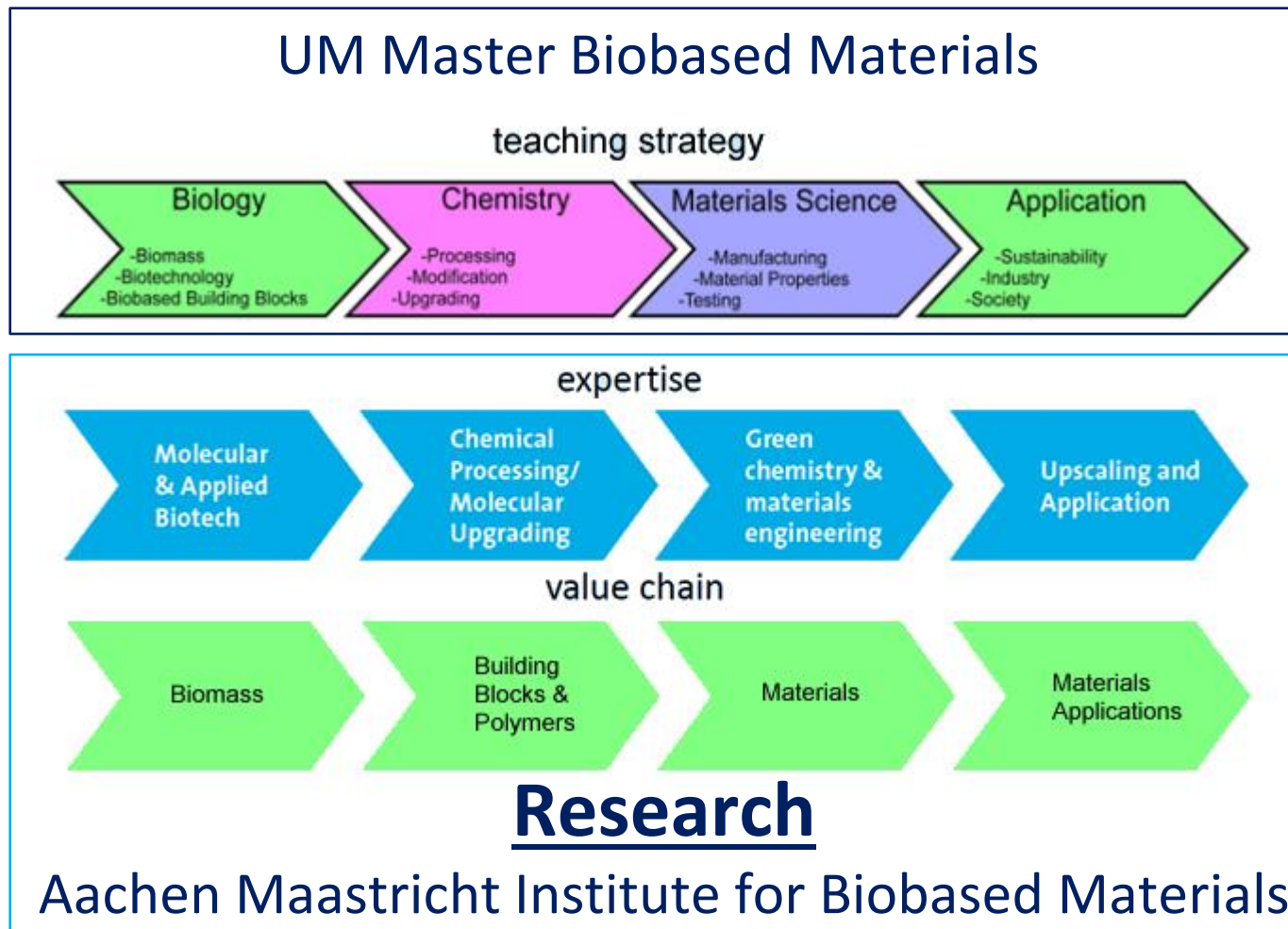
- Aachen Maastricht Institute for Biobased materials (*AMIBM; UM & RWTH Aachen & Fraunhofer IME & ITA, etc.*)
- Chemelot campus industry (*DSM, SABIC, ... and SMEs*)
- Chemelot InScite (public-private UM, TU/Eindhoven, DSM)
- and other companies (*e.g. Corbion*)

through

- Co-designing courses and tasks/research problems
- Lectures in courses
- Personal coach for our students
- Master thesis research project & short projects

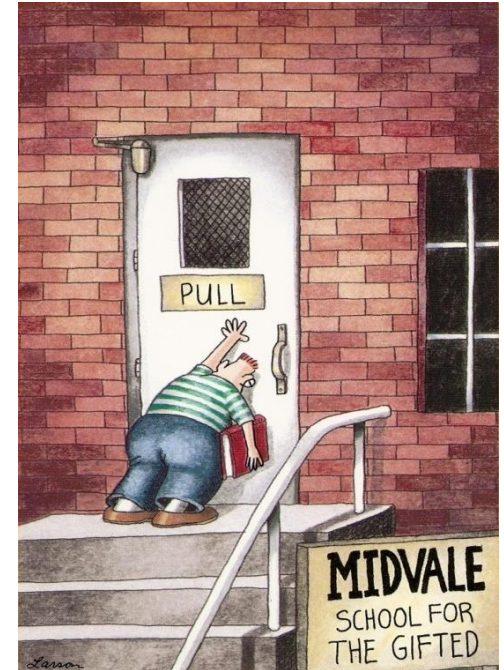


Biobased value chain in teaching & research



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



Two 2017-2018 students: Rocio and Julian



Rocio Arreguin Campos
(Mexico)

“The courses help me to get the inspiration and knowledge to create new and functional materials from biological resources that could one day replace some of the plastics”



Julian Engelhardt
(Germany)

“I experience this programme with high potential to develop new scientists, who can move us towards more sustainable and innovative materials”

Contact/Information

Email: Bbm-info@maastrichtuniversity.nl

Website: www.maastrichtuniversity.nl/FHS/biobased-materials

