Center for Microbial Ecology and Technology

Faculty of Bioscience Engineering ⇒ Department of Biotechnology ⇒ CMET

80 staff: 20 postdoctoral, 40 PhD, 10 support staff (5 supported through UGent)

Annually ~ 30 master students for thesis

5 full time professors, 3 guest professors
And yet, this scale of operation is insufficient to truly address major challenges.
Implementation of technology for resource recovery is slow

- Decentralized, project based
- Targets are undefined
- Business case is limited or unclear for problem owner
Pikaar et al. ES&T 2017

Elected Best Feature Article 2017
CAPTURE - Research Principles

• CAPTURE wants to deliver excellent research and technology development through open collaboration between researchers, industry and other stakeholders

• Choices need to be made: CAPTURE focuses on programs together with partners:
  - These are not exclusive rather priority is given
  - Academic freedom is in no way curtailed

• Growth is certainly not the only or key driver
The CAPTURE approach

1. PIPELINE CLUSTERING
   - Expertise
     - Technology pipelines
     - Flagship projects
     - Open marketplace
   - Infrastructure
     - Unique equipment
     - Building as accelerator
   - Stakeholders
     - Early stage value-chain involvement

2. EFFECTIVE ACCELERATING ENVIRONMENT

3. TRAINING OF MULTIDISCIPLINARY FUTURE PROFESSIONALS

Disruptive Innovation
Accelerating Resource Recovery
Level 3 + 4: Business Accelerator

Level 1+ 2: Technology Accelerator (Testing facilities, benches and chairs)

Level 0: Tech Hall: upscaling & demonstration
Flagship project: improved

- Worldwide unique infrastructure
- 3 Modular Mobile units on 3 sites
- 4.8 M€

www.improvedwater.eu
CAPTURE water

• Urine treatment, focus on N recovery
• Production of feed and food as microbial protein
• Production of organic building blocks from dilute streams
• ....
Industrial affiliate program

Homogenous Catalysis
- NHC catalysis
  - Special interest in abundant transitions metals
- Heterogeneous catalysis
- Molecular modeling, kinetics and characterization

Applications:
- CO₂ to fine/commodity chemicals,
- CO₂ to fuels and chemicals

Heterogeneous Catalysis
- Novel catalysts for mild conditions reactions
- Design of multiple active sites
- Methanation catalysts
- Molecular modeling, kinetics and characterization

Applications:
- CO₂ to commodity chemicals and fuels/chemicals

Biocatalysis

Microbial Electrosynthesis (MES)
- Microbial adherence
- In line separation of organic products
- MES reactor design

Applications:
- CO₂ to fuels and chemicals
- CO₂ to proteins
MELiSSA
The CAPTURE approach

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2. Effective Accelerating Environment

3. Training of Multidisciplinary Future Professionals

Disruptive Innovation
Accelerating Resource Recovery
Effective cleantech acceleration environment

Entrepreneurs
Researchers
Start-ups SME’s
Corporate R&D labs

Services supporting:
Incubation
Growth
Internationalisation
Entrepreneurship: spin-offs

Smart Systems, Effective Solutions

Strategic Water is a water and environmental sanitation engineering firm specialising in data management and strategic systems planning in the water and sanitation sector in emerging markets. Our mission is to bring hard data and machine learning to the water supply chain in order to streamline services across the globe.

AM-TEAM is a globally active company, focussing on advanced process modelling. The unique combination of process understanding and advanced modelling frameworks brings models very close to reality, allowing drastic process improvement and accelerated scale-up in the water, biotech and pharma fields.
The CAPTURE approach

1. Pipeline Clustering
   - Expertise
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2. Effective Accelerating Environment

3. Training of Multidisciplinary Future Professionals

Disruptive Innovation
Accelerating Resource Recovery
Training of multidisciplinary (future) professionals

- Super-W European Joint Doctorate Programme
  - 15 PhD Students
  - Sustainable Resource Recovery from Water
- EIT Raw Materials
  - New International MSc SINREM
- Centre for Environmental Science & Technology
- Multiple International partners – GUGC?
- Lifelong Learning
CAPTURE - summary

• Collaborative center based on excellent science, translation
• Good model for interaction with MELiSSA to couple terrestrial applications
  • Research
  • Education
  • Commercialisation