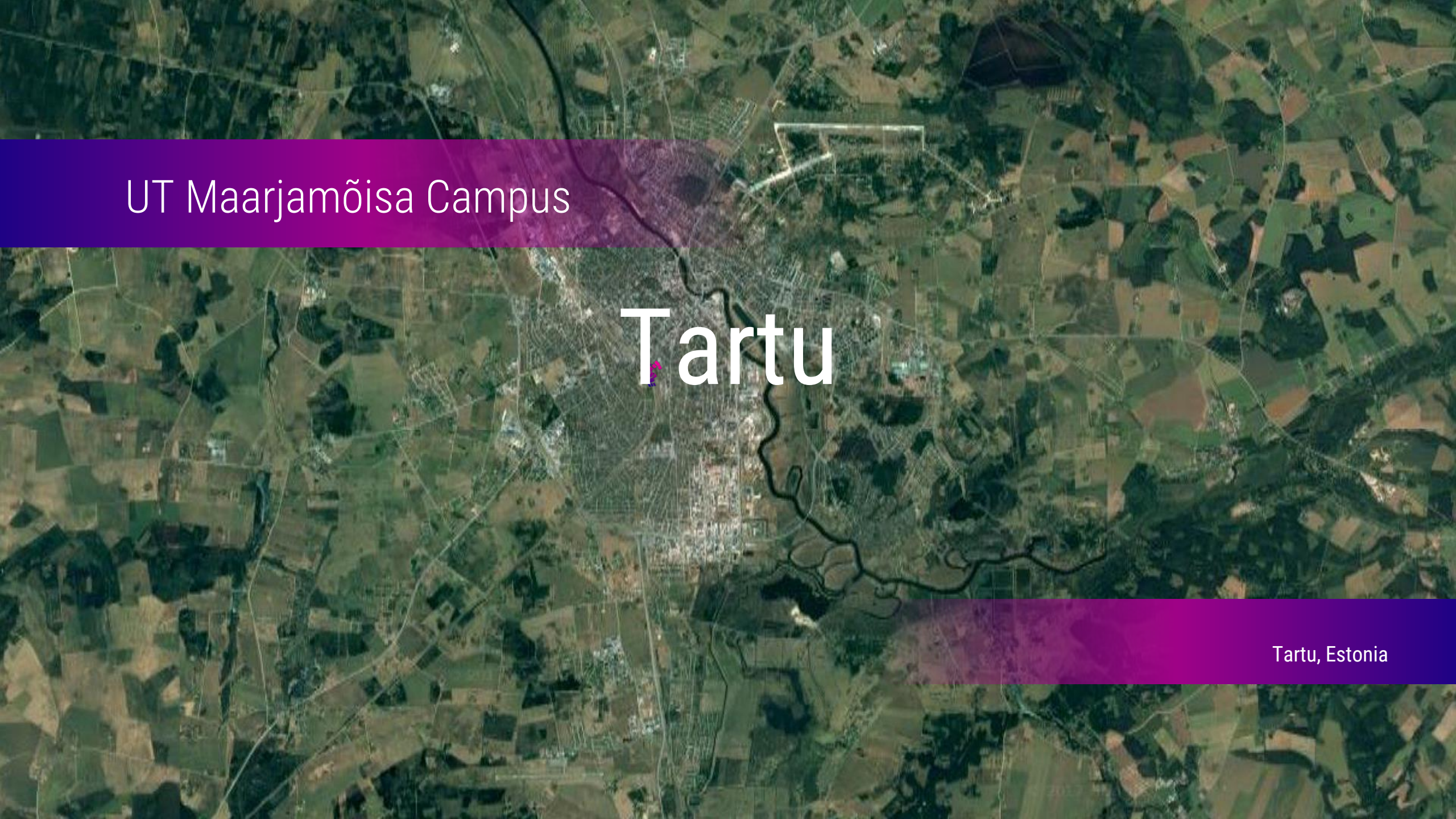
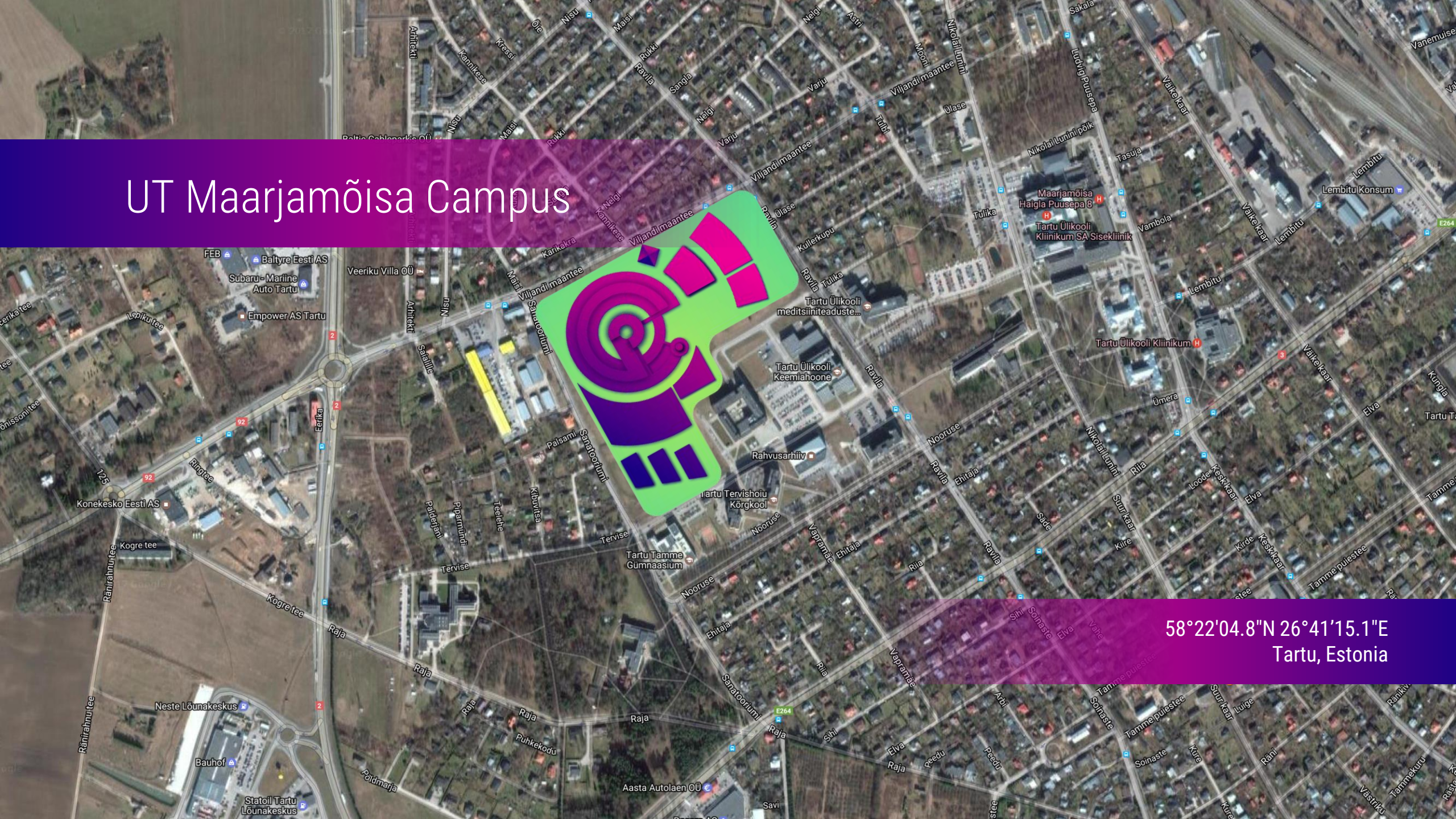
ERA Chair projects SynBioTEC and GasFermTEC

Mart Loog
Institute of Technology
Estonian Centre for Biosustainability
University of Tartu, Estonia


UT Maarjamõisa Campus
Estonia
Tartu
Estonia


UT Maarjamõisa Campus
Tartu
Tartu, Estonia

UT Maarjamõisa Campus

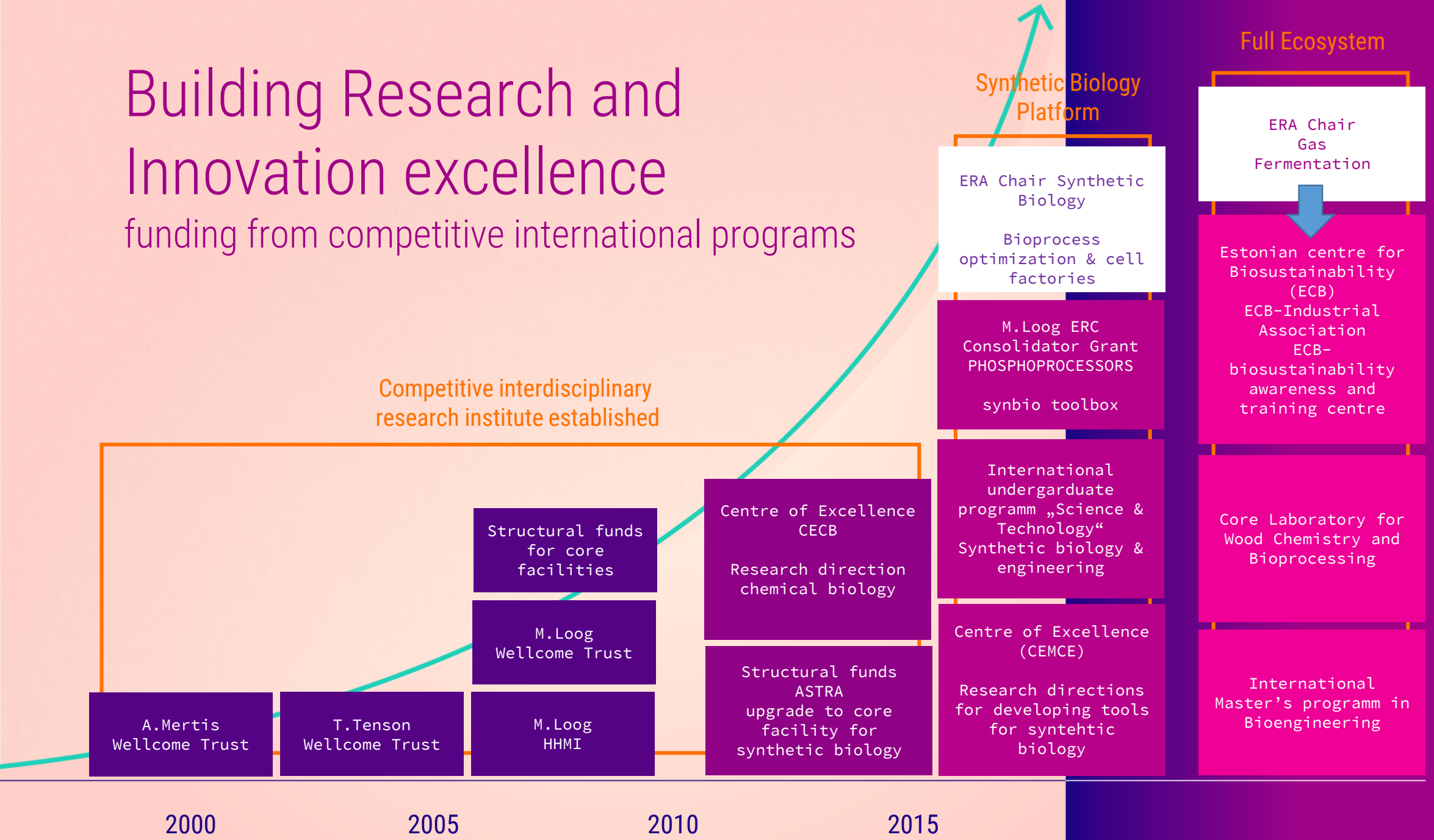


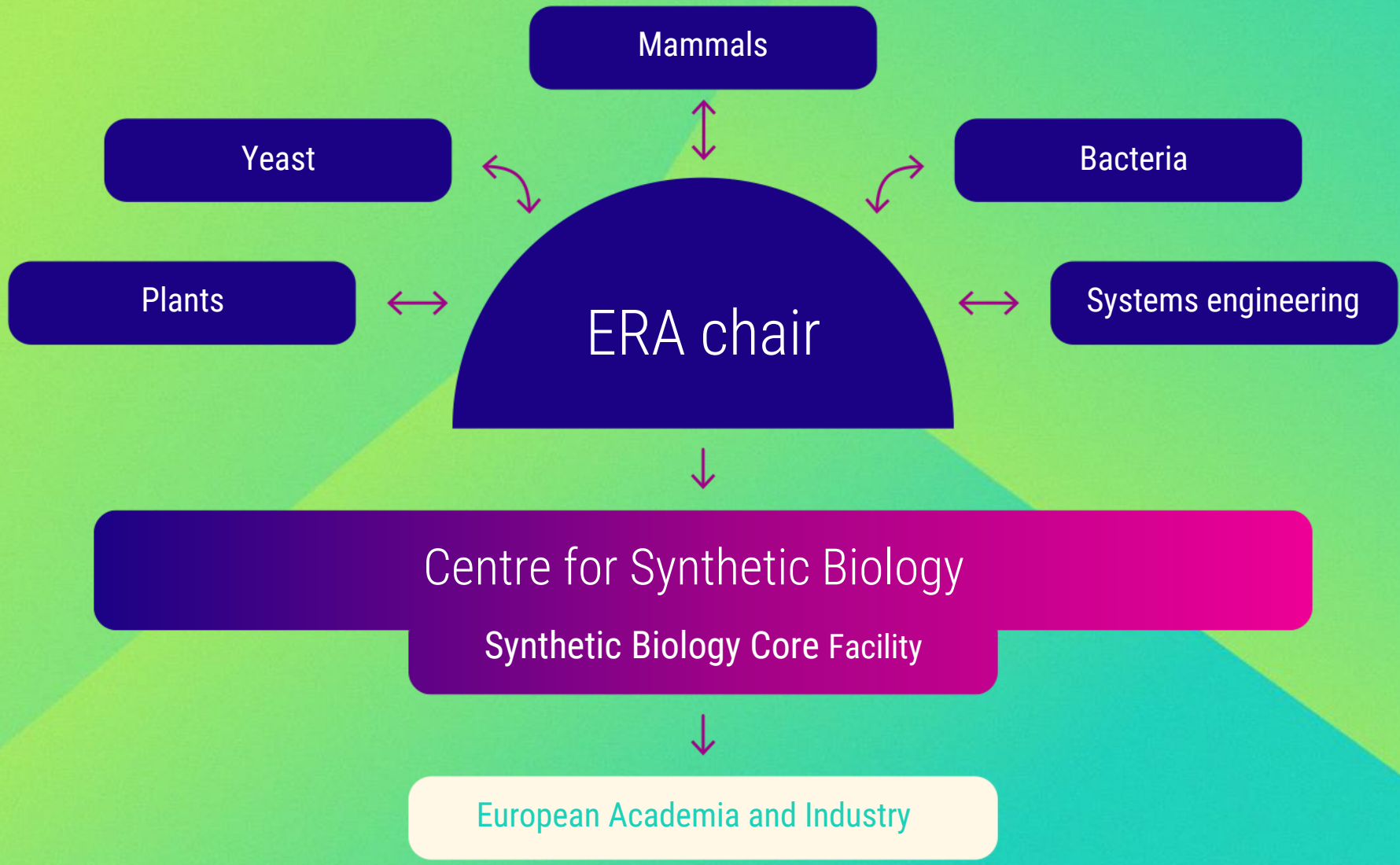
58°22'04.8"N 26°41'15.1"E
Tartu, Estonia

Institute of Technology (2006)

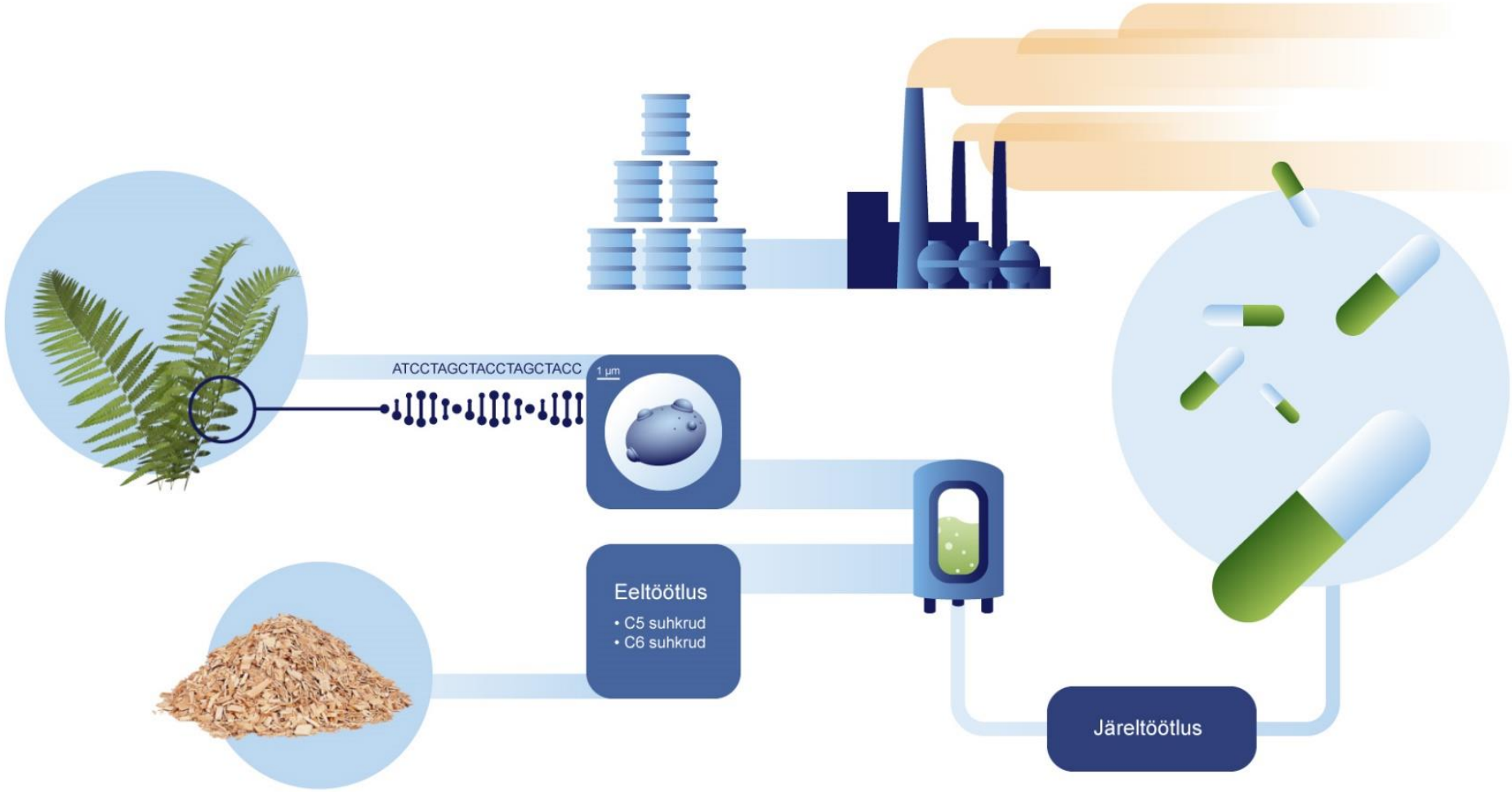
Building Research and Innovation excellence

funding from competitive international programs




Mammals
Yeast
Bacteria
Plants
Systems engineering
ERA chair
Centre for Synthetic Biology
Synthetic Biology Core Facility
European Academia and Industry

Traditional Chemical Industry



Cell Factories and Bioprocessing

Petri-Jaan Lahtvee

ERA Chair in Synthetic Biology

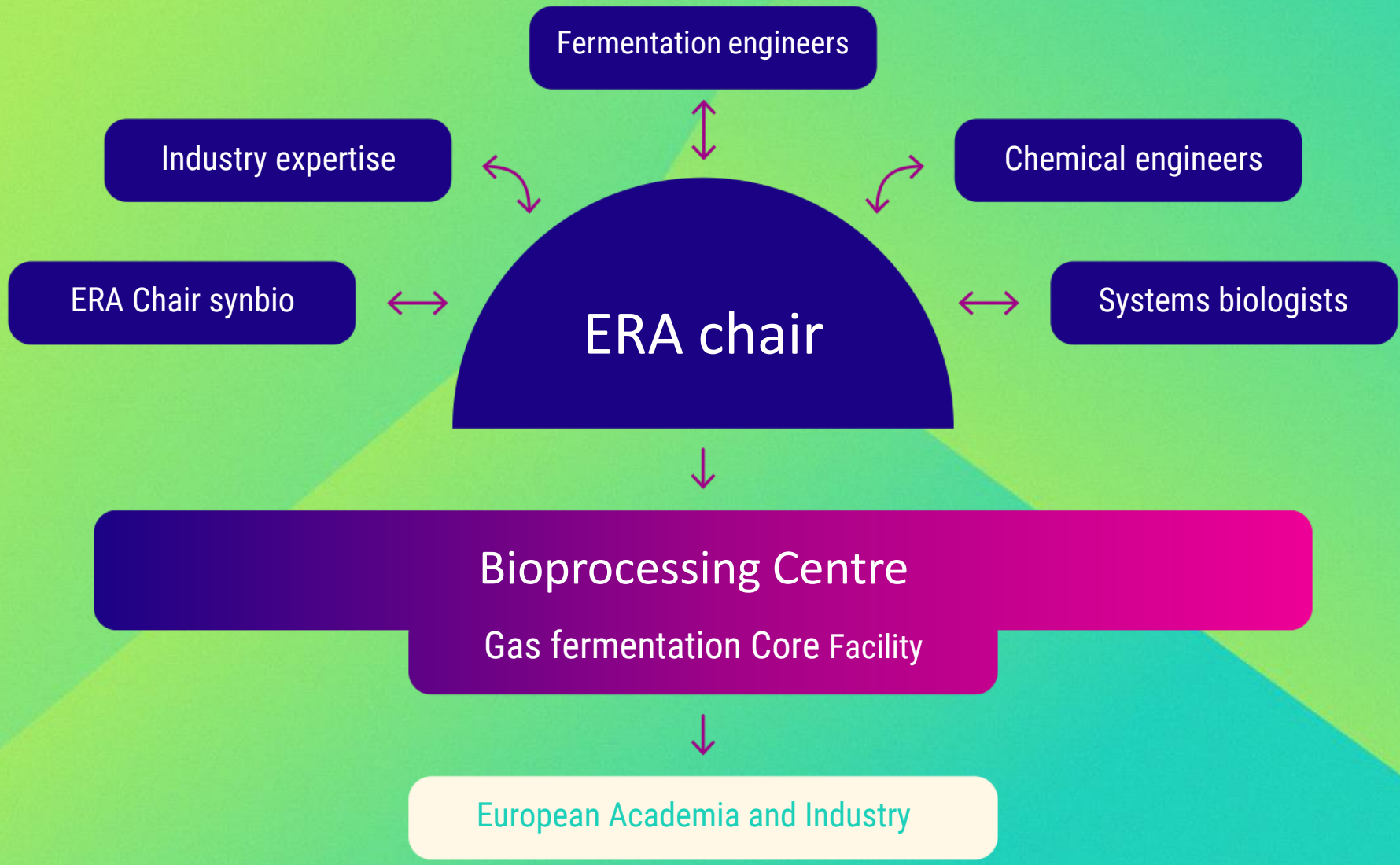
Petri-Jaan Lahtvee is leading the ERA Chair in Synthetic Biology research group at University of Tartu. His group is focused on designing cell factories for prooduction of bio-based chemicals and they are using multi-omic analysis for determination of genotype-phenotype associations.

ERA Chair in Synthetic Biology research group

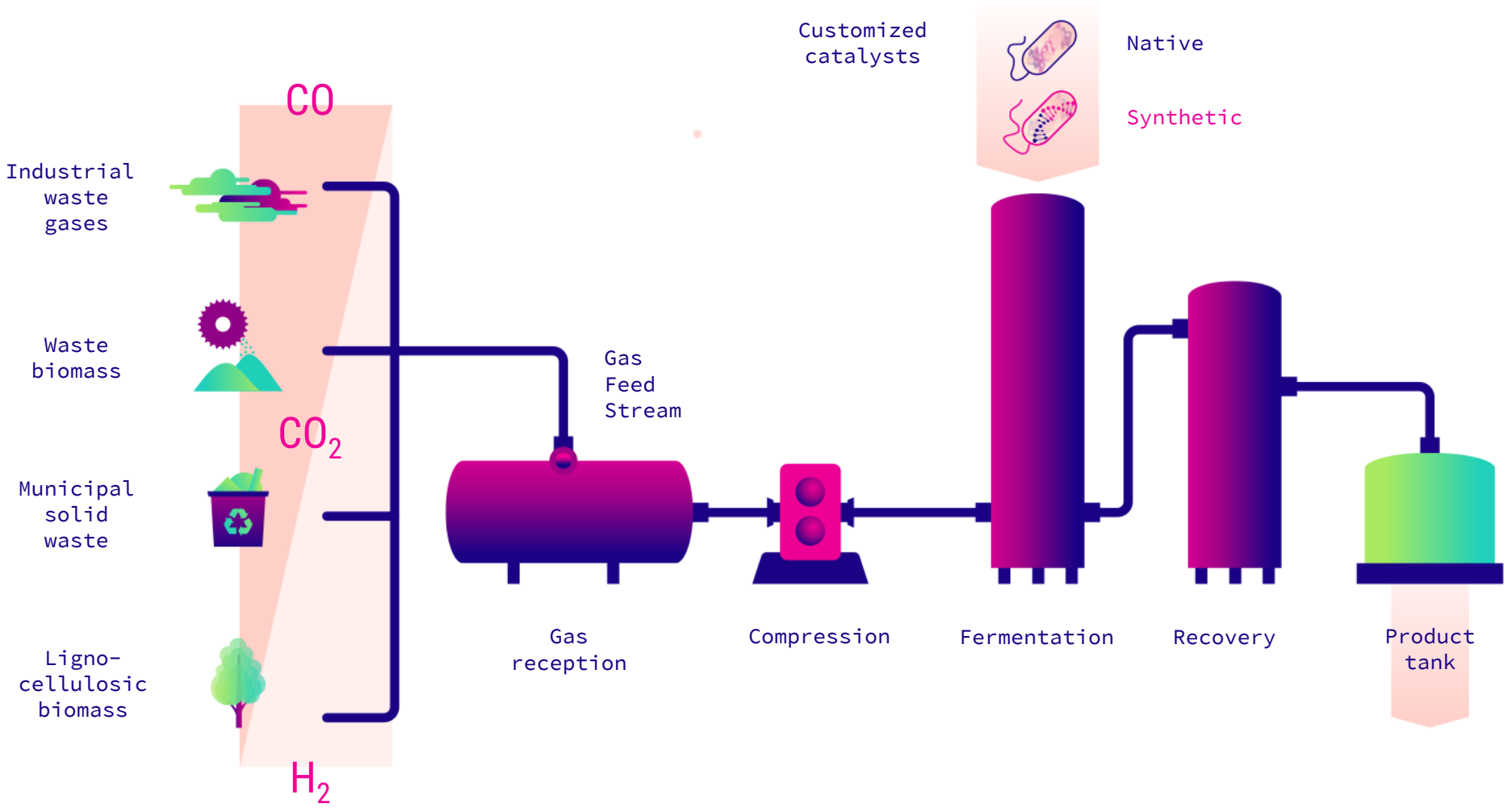
- 12+ people
  - PI/Group Leader
  - 3 postdocs
  - 2 Research engineers
  - 1 PhD student
  - 3 visiting PhD students
  - 3 undergraduates
  - 2 visiting undergraduates
- 3 complementary fields
  - Metabolic engineering (synthetic biology)
  - Fermentation Technologies
  - Bioinformatics/Systems biology
- Interdiciplinary institutional, local and international collaborations


2019


2020


Fermentation engineers
Industry expertise
Chemical engineers
ERA Chair synbio
ERA chair
Systems biologists
Bioprocessing Centre
Gas fermentation Core Facility
European Academia and Industry

Gas-fermentation



Kaspar Valgepea, PhD

Group Leader/Senior Research Fellow

SEARCH

NEWS

- Research article published from the ERA Chair and collaborators in Proceedings of the National Academy of Sciences (PNAS)
- Research article published from the ERA Chair and collaborators in Frontiers in Bioengineering and Biotechnology
- Start-up of the state-of-the-art gas fermentation facility at GasFermTEC
- Preprint from the ERA Chair and

Gas fermentation platform at ECB

LanzaTech

UNIVERSITY OF TARTU
1632

Core Laboratory for Wood Chemistry and Biotechnology

www.woodbiotech.com

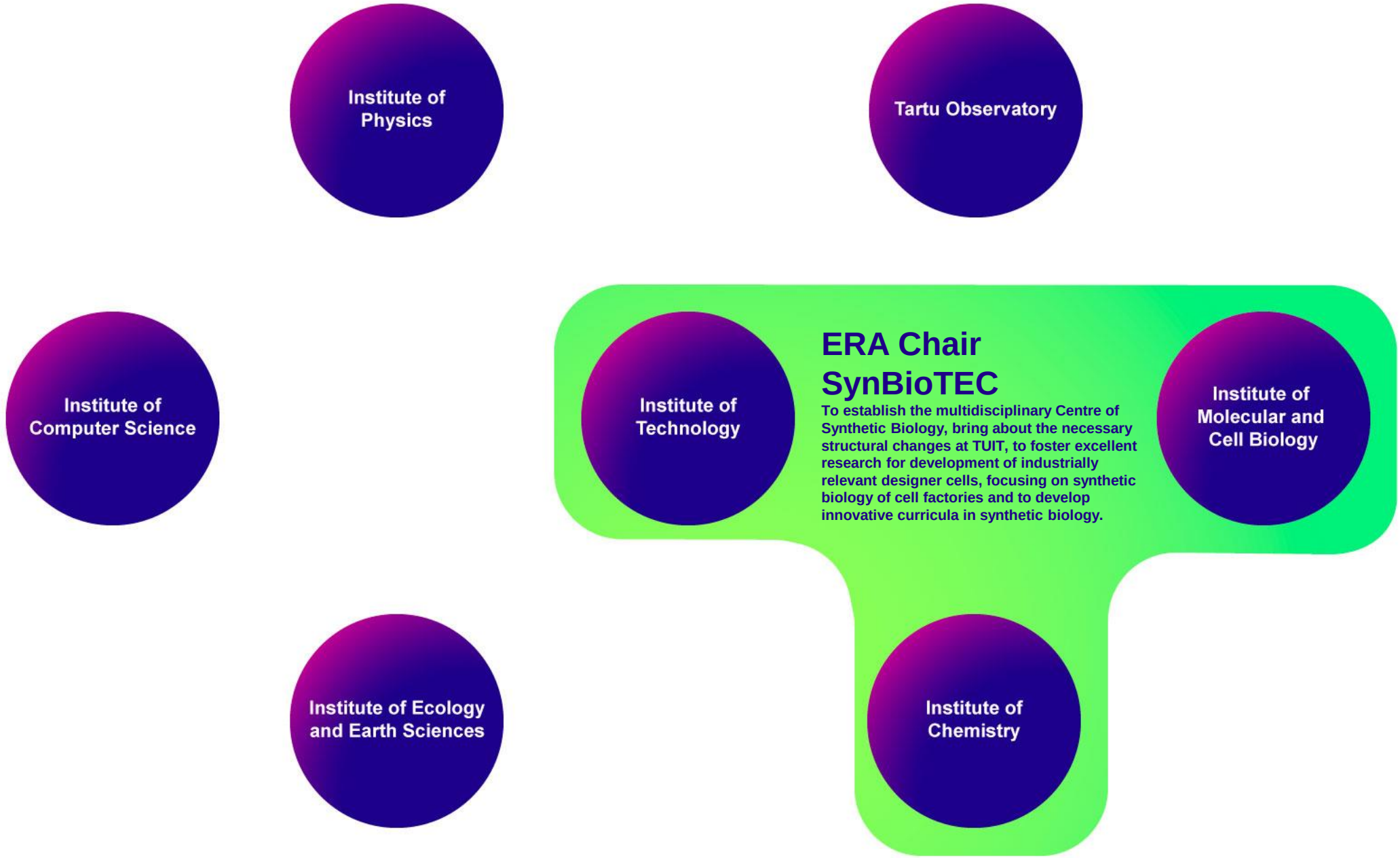
Local substrate

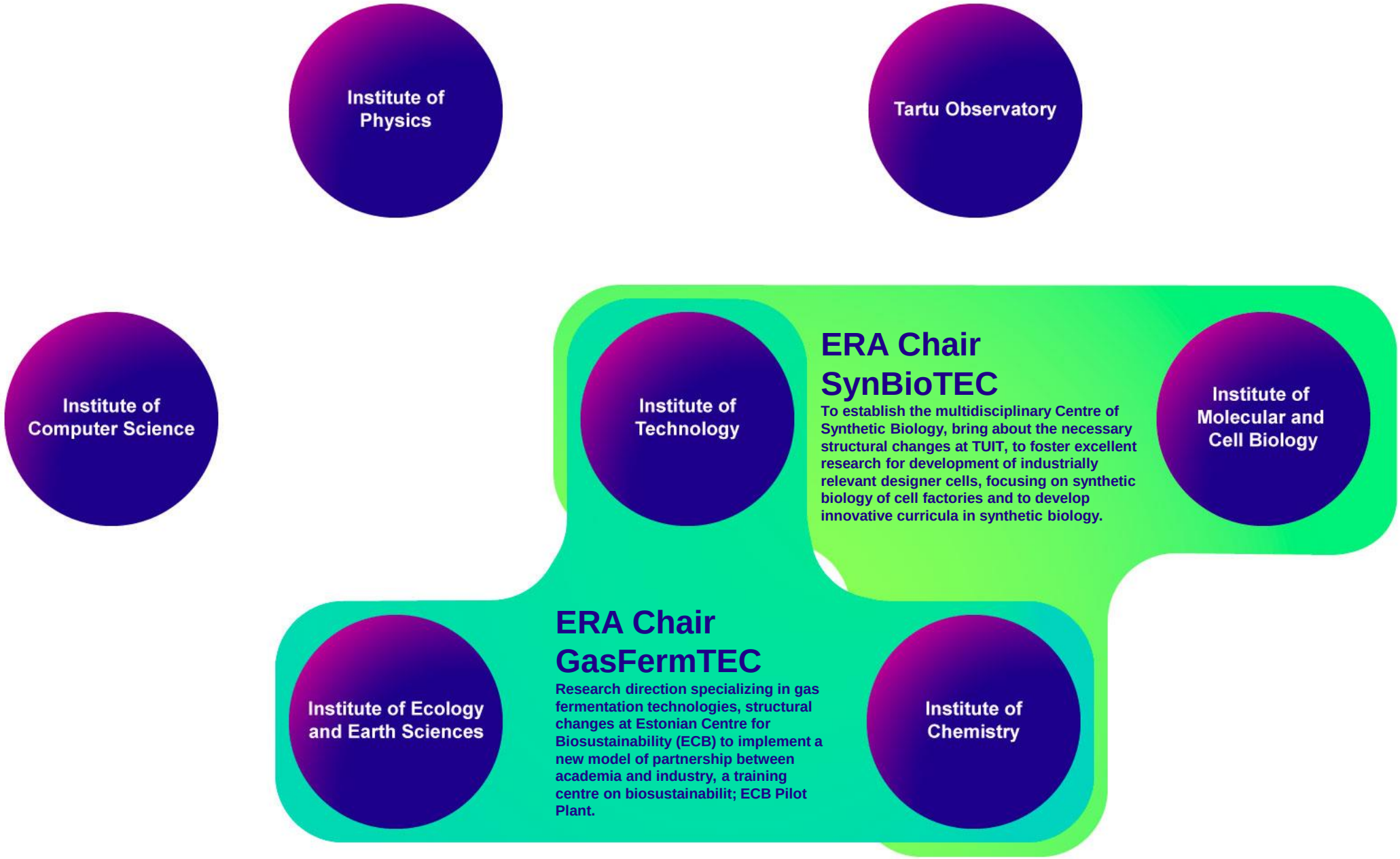
Value added chemicals

Lessons learned

- Structural changes – creation of new centres for new global challenges
- Recruitment of the ERA Chair – who is the best candidate?
- Sustainability – negotiate with the university to design a motivating long-term career plan and ambitious goal
- Public engagement and outreach (CSA means much more than just research)


Institute of Physics
Tartu Observatory
Institute of Computer Science
Institute of Technology
Institute of Molecular and Cell Biology
Institute of Ecology and Earth Sciences
Institute of Chemistry


Institute of Physics
Tartu Observatory
Institute of Computer Science
Institute of Technology
ERA Chair SynBioTEC
To establish the multidisciplinary Centre of Synthetic Biology, bring about the necessary structural changes at TUIT, to foster excellent research for development of industrially relevant designer cells, focusing on synthetic biology of cell factories and to develop innovative curricula in synthetic biology.
Institute of Molecular and Cell Biology
Institute of Ecology and Earth Sciences
Institute of Chemistry


Institute of Physics
Tartu Observatory
Institute of Computer Science
Institute of Technology
ERA Chair SynBioTEC
To establish the multidisciplinary Centre of Synthetic Biology, bring about the necessary structural changes at TUIT, to foster excellent research for development of industrially relevant designer cells, focusing on synthetic biology of cell factories and to develop innovative curricula in synthetic biology.
Institute of Molecular and Cell Biology
Institute of Ecology and Earth Sciences
ERA Chair GasFermTEC
Research direction specializing in gas fermentation technologies, structural changes at Estonian Centre for Biosustainability (ECB) to implement a new model of partnership between academia and industry, a training centre on biosustainabilit; ECB Pilot Plant.
Institute of Chemistry

ERA Chair MATTER

MATTER will combine competence of research groups in University of Tartu in the fields of multiscale computer simulations, nanomanipulation, nanotechnology applications and molecular biology, and use of nanomaterials in extreme environments with the aim of creating Centre of MATerials in Extreme EnviRonments.

Institute of Physics

Tartu Observatory

Institute of Computer Science

Institute of Technology

ERA Chair SynBioTEC

To establish the multidisciplinary Centre of Synthetic Biology, bring about the necessary structural changes at TUIT, to foster excellent research for development of industrially relevant designer cells, focusing on synthetic biology of cell factories and to develop innovative curricula in synthetic biology.

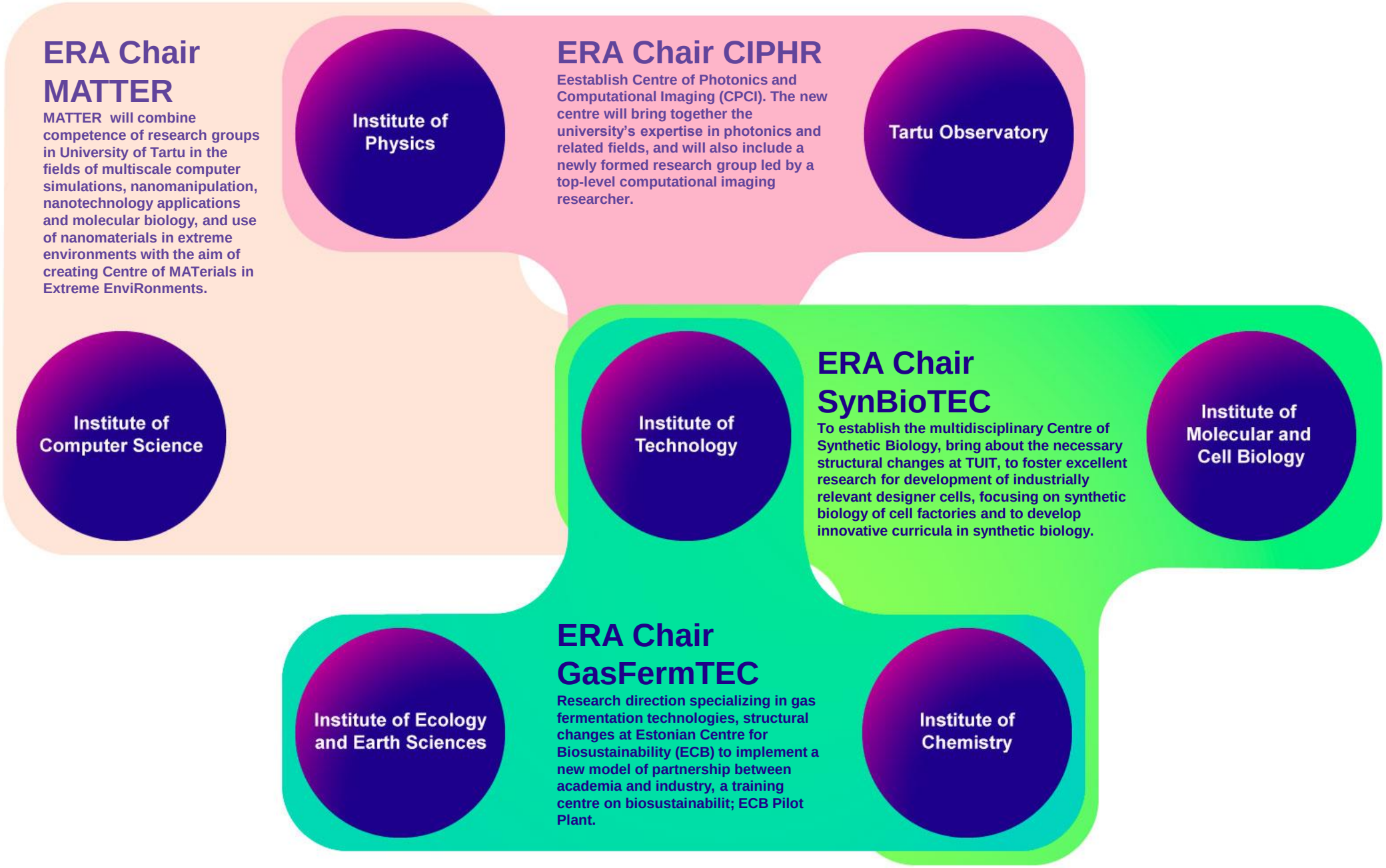
Institute of Molecular and Cell Biology

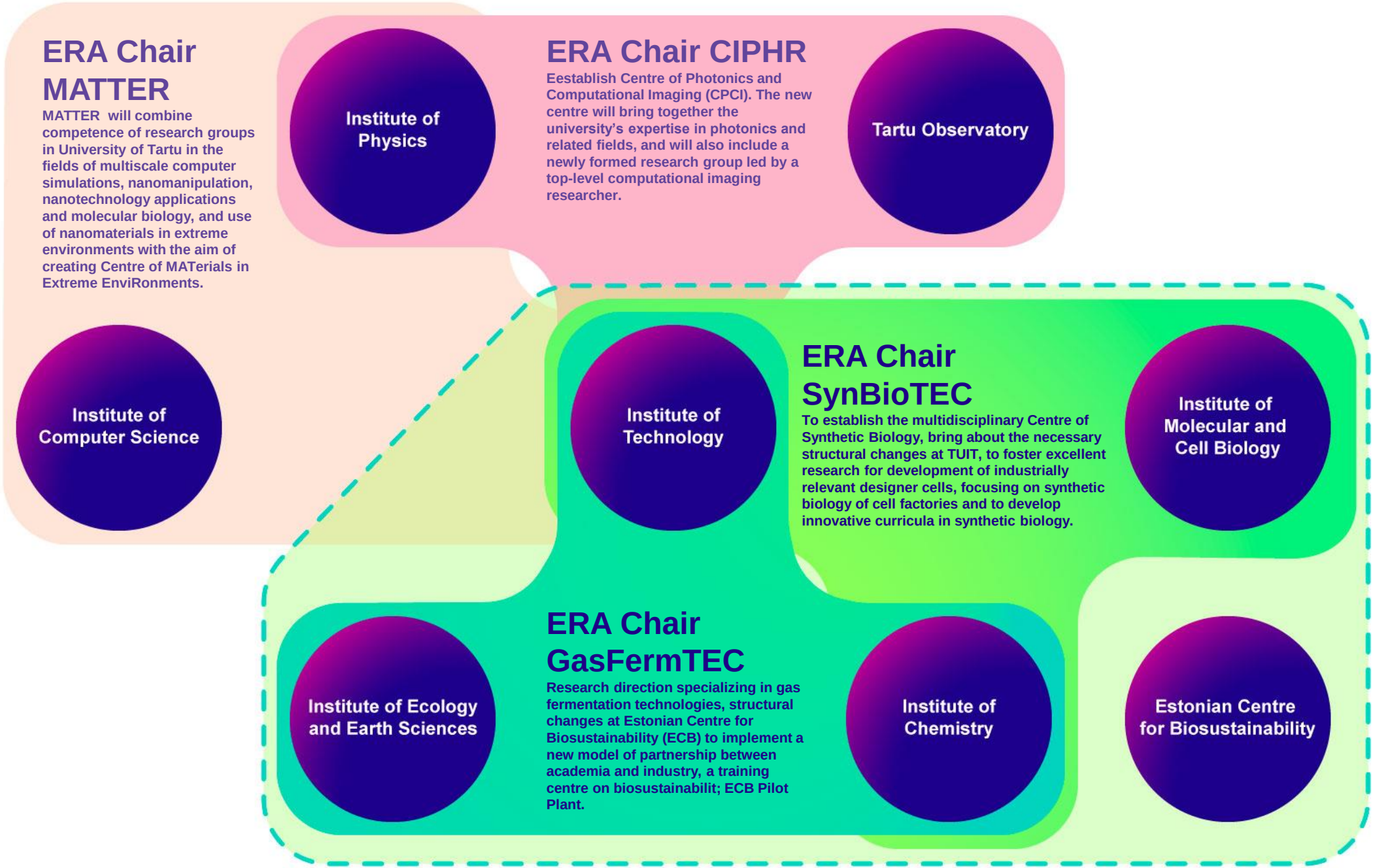
Institute of Ecology and Earth Sciences

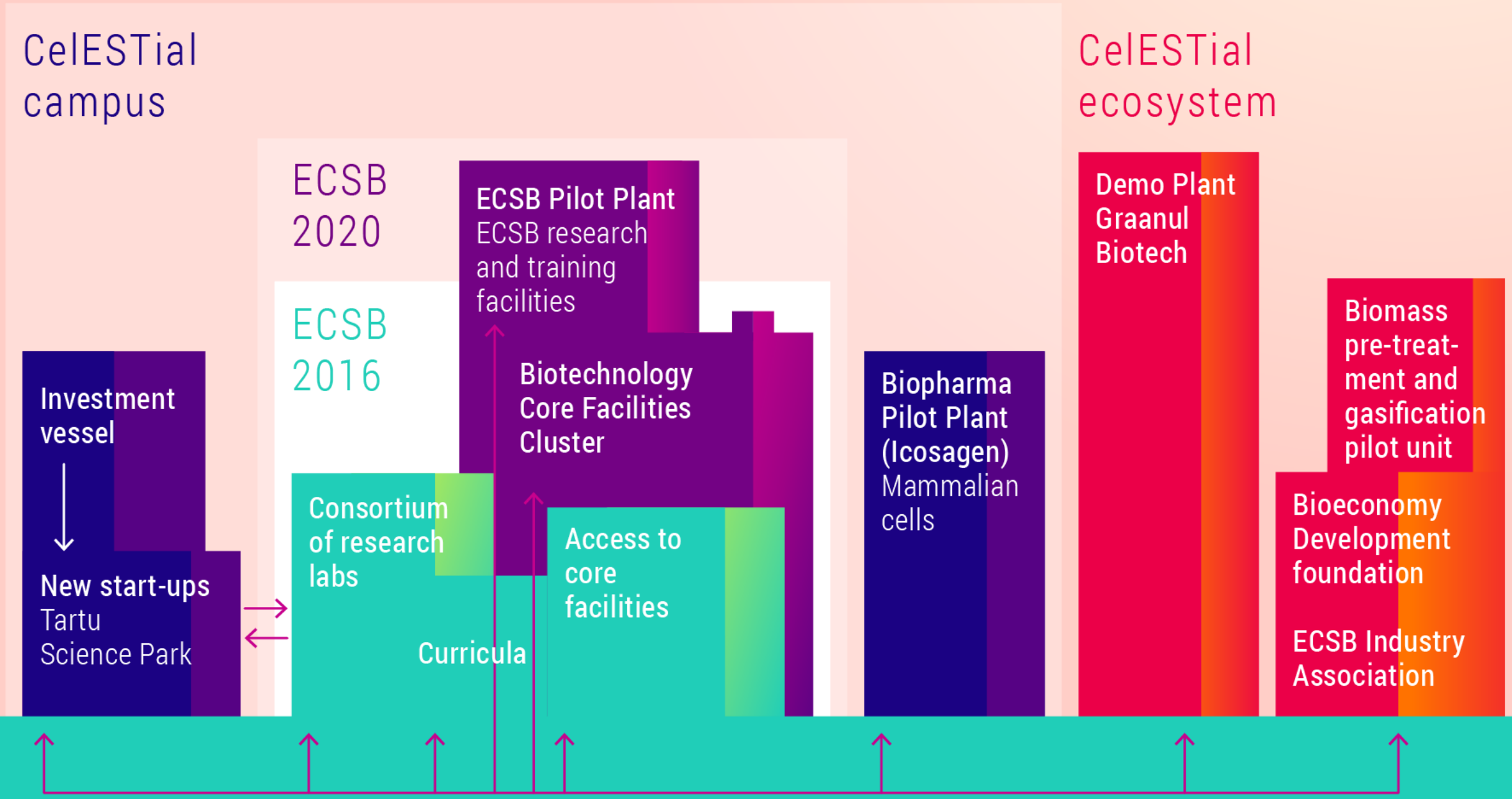
ERA Chair GasFermTEC

Research direction specializing in gas fermentation technologies, structural changes at Estonian Centre for Biosustainability (ECB) to implement a new model of partnership between academia and industry, a training centre on biosustainabilit; ECB Pilot Plant.

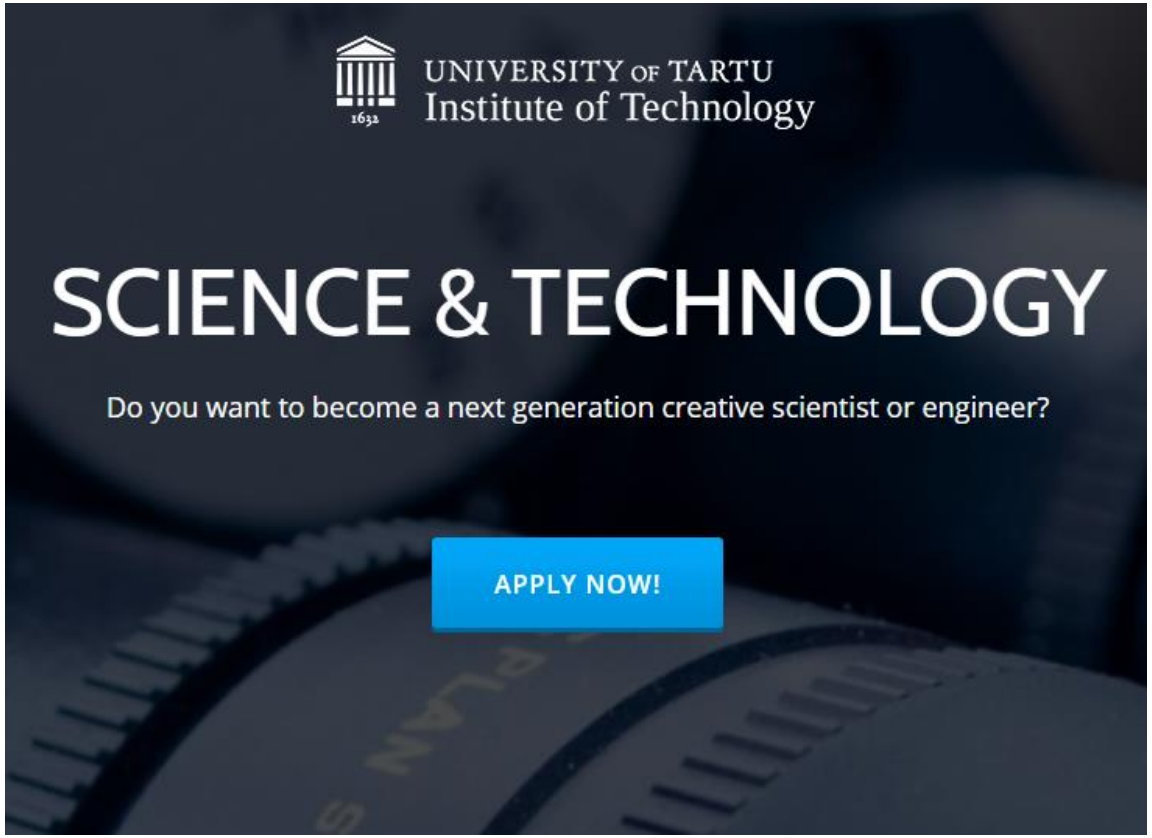
Institute of Chemistry

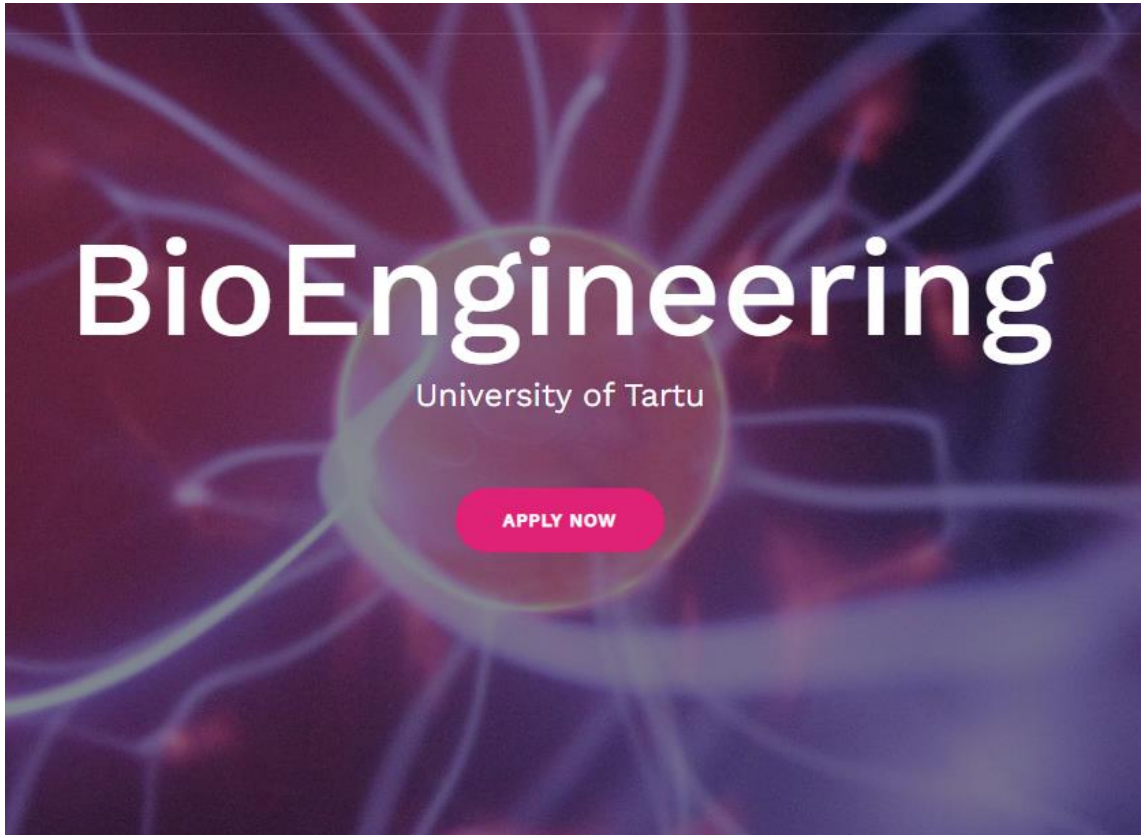

ERA Chair MATTER
MATTER will combine competence of research groups in University of Tartu in the fields of multiscale computer simulations, nanomanipulation, nanotechnology applications and molecular biology, and use of nanomaterials in extreme environments with the aim of creating Centre of MATerials in Extreme EnviRonments.
Institute of Physics
ERA Chair CIPHR
Eestablish Centre of Photonics and Computational Imaging (CPCI). The new centre will bring together the university's expertise in photonics and related fields, and will also include a newly formed research group led by a top-level computational imaging researcher.
Tartu Observatory
Institute of Computer Science
Institute of Technology
ERA Chair SynBioTEC
To establish the multidisciplinary Centre of Synthetic Biology, bring about the necessary structural changes at TUIT, to foster excellent research for development of industrially relevant designer cells, focusing on synthetic biology of cell factories and to develop innovative curricula in synthetic biology.
Institute of Molecular and Cell Biology
Institute of Ecology and Earth Sciences
ERA Chair GasFermTEC
Research direction specializing in gas fermentation technologies, structural changes at Estonian Centre for Biosustainability (ECB) to implement a new model of partnership between academia and industry, a training centre on biosustainabilit; ECB Pilot Plant.
Institute of Chemistry


ERA Chair MATTER
MATTER will combine competence of research groups in University of Tartu in the fields of multiscale computer simulations, nanomanipulation, nanotechnology applications and molecular biology, and use of nanomaterials in extreme environments with the aim of creating Centre of MATerials in Extreme EnviRonments.
Institute of Physics
ERA Chair CIPHR
Eestablish Centre of Photonics and Computational Imaging (CPCI). The new centre will bring together the university's expertise in photonics and related fields, and will also include a newly formed research group led by a top-level computational imaging researcher.
Tartu Observatory
Institute of Computer Science
Institute of Technology
ERA Chair SynBioTEC
To establish the multidisciplinary Centre of Synthetic Biology, bring about the necessary structural changes at TUIT, to foster excellent research for development of industrially relevant designer cells, focusing on synthetic biology of cell factories and to develop innovative curricula in synthetic biology.
Institute of Molecular and Cell Biology
Institute of Ecology and Earth Sciences
ERA Chair GasFermTEC
Research direction specializing in gas fermentation technologies, structural changes at Estonian Centre for Biosustainability (ECB) to implement a new model of partnership between academia and industry, a training centre on biosustainabilit; ECB Pilot Plant.
Institute of Chemistry
Estonian Centre for Biosustainability


CelESTial campus
ECSB 2020
ECSB 2016
ECSB Pilot Plant
ECSB research and training facilities
Biotechnology Core Facilities Cluster
Investment vessel
New start-ups
Tartu Science Park
Consortium of research labs
Curricula
Access to core facilities
Biopharma Pilot Plant (Icosagen)
Mammalian cells
CelESTial ecosystem
Demo Plant
Graanul Biotech
Biomass pre-treat-ment and gasification pilot unit
Bioeconomy Development foundation
ECSB Industry Association

New curricula





International, innovative curricula combining molecular biology and engineering

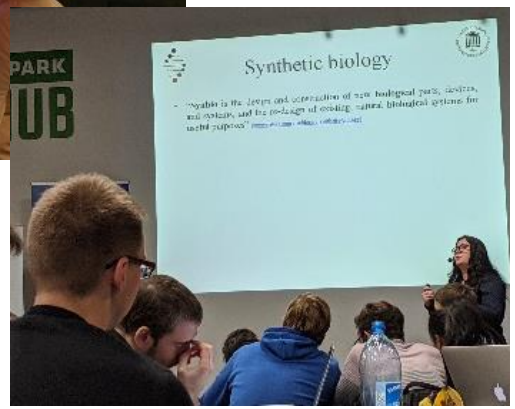
Following the examples of the leading universities

200+ undergraduate students + masters and Ph.D programs from 35 diferent countries

International education centre for biosustainable technologies, combining synthetic biology and engineering

iGEM

Public engagement



22/10/2020

Tartu TUIT igem team got the gold medal for developing industrial yeast cell which can be used also in wood industry

22/10/2020

Bioengineering Master's program at University of Tartu will provide the possibility to study wood chemistry and bioprocessing

03/09/2019

University of Tartu and Graanul Invest to launch innovative doctoral project on chemical and biotechnological wood valorisation


Synthetic Biology
based on standard parts
iGEM Estonia Team
Silver Medal - 2018
Gold Medal - 2019
Gold Medal - 2020