

An aerial photograph of the Tallinn University of Technology campus during the golden hour of sunset. The image shows a dense cluster of multi-story university buildings, interspersed with green trees and open spaces. The sky is a warm, hazy orange, and the overall scene is bathed in soft, golden light. In the background, a city skyline and a body of water are visible under the same warm glow.

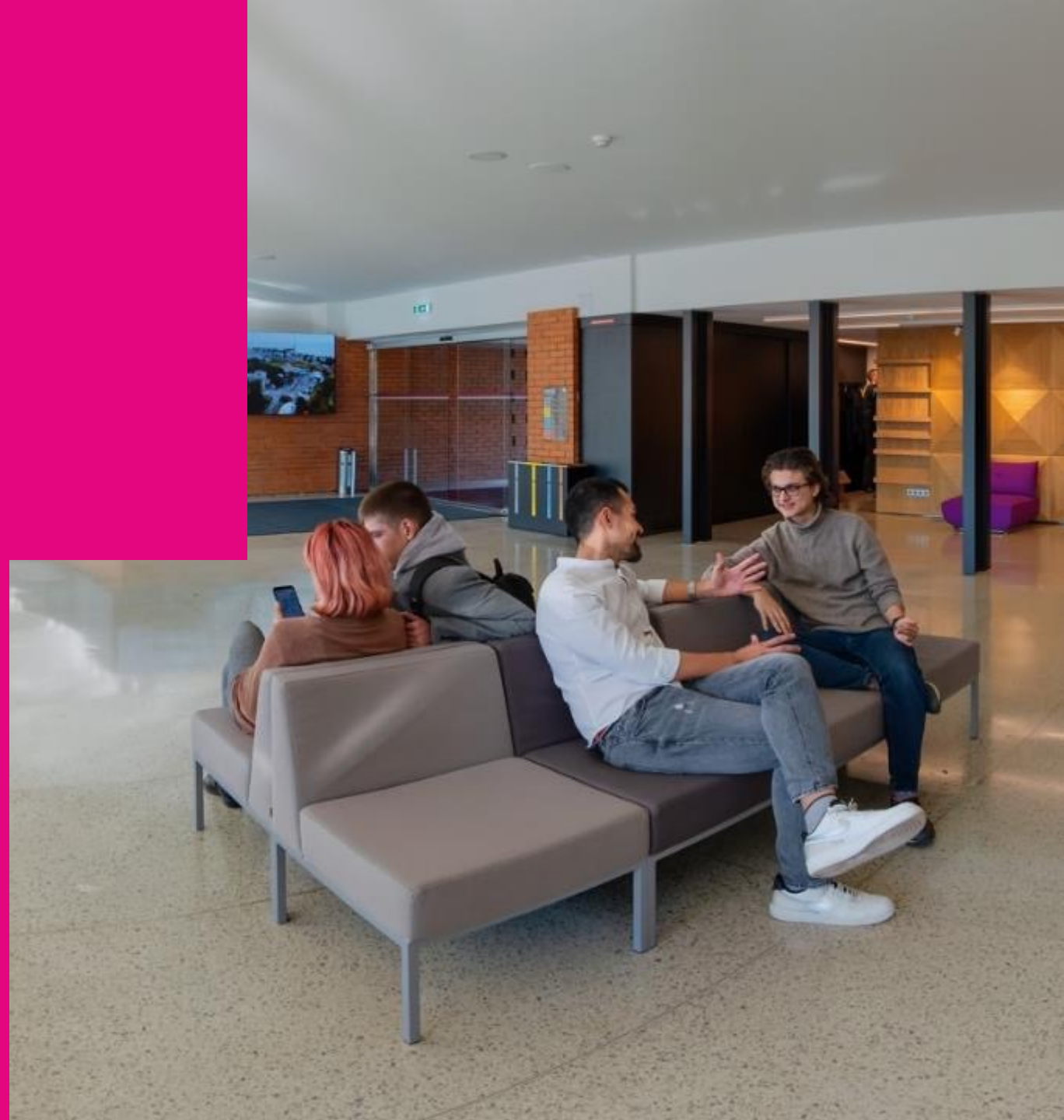
**TAL
TECH**

**TALLINN UNIVERSITY
OF TECHNOLOGY**

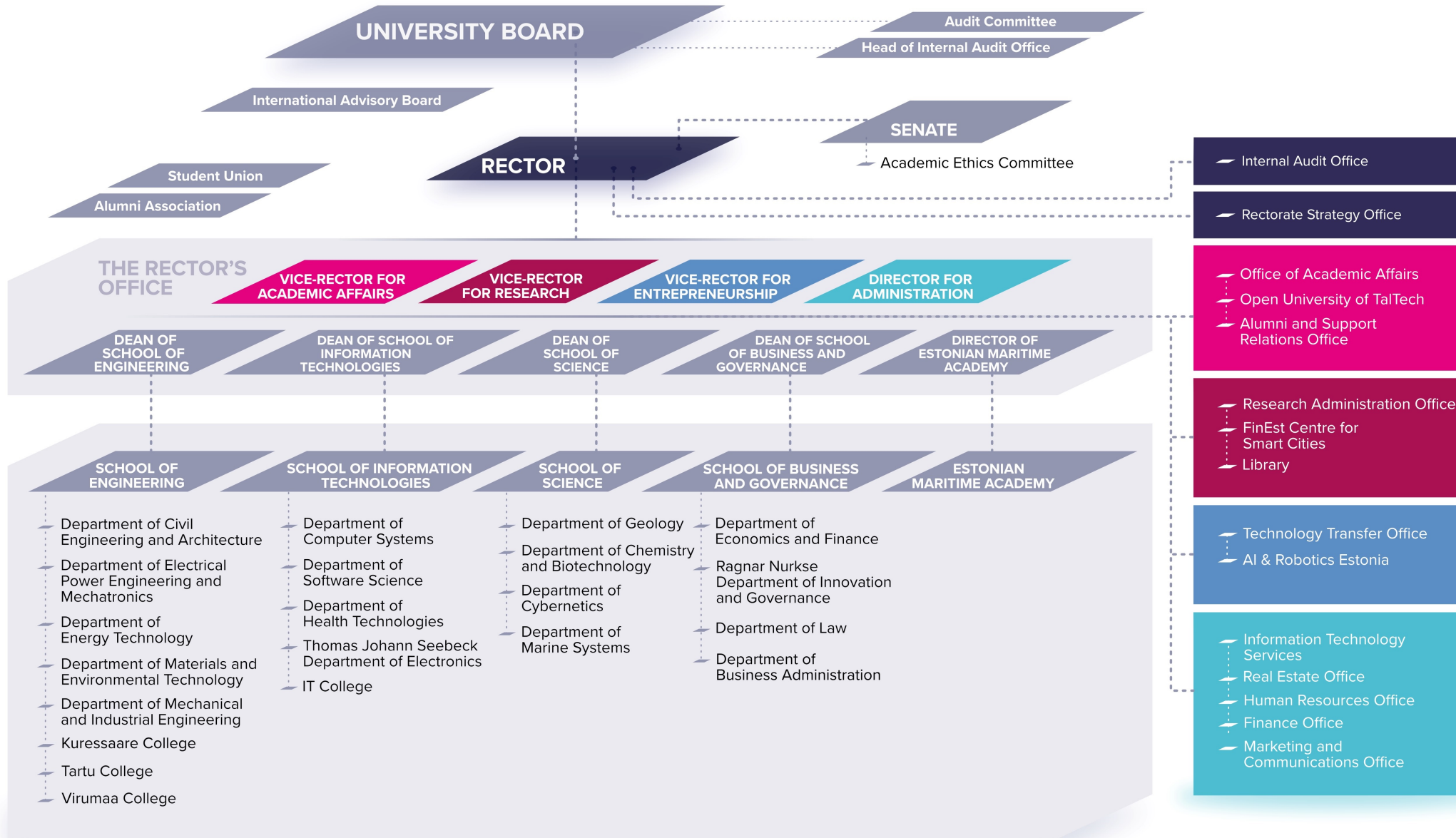
TALLINN UNIVERSITY OF TECHNOLOGY

To lead Estonia and the world into a sustainable digital future

- Founded in 1918, TalTech is the sole technological university in Estonia. It is also the most international university in Estonia. Of the nearly 10,000 enrolled students, approximately 16% come from 100 different countries across the globe.
- TalTech is a research-based university offering Bachelor's, Master's and Doctorate degrees in **technology, applied science, IT, business and maritime studies**.
- As a leader in science, technology, and innovation, the school maintains constant interaction with universities around the world, bringing together scientists, students, and entrepreneurs.



STRUCTURE



TALLINN UNIVERSITY OF TECHNOLOGY 2023

An aerial photograph of the Tallinn University of Technology campus, showing various buildings, green spaces, and a road in the foreground. The image is used as a background for the statistics overlay.

8,846
students

876 International students
from **85** different countries
80 study programmes
5 joint programmes
23 international programmes

2,050
employees

67 nationalities
44.92 average age
146 professors

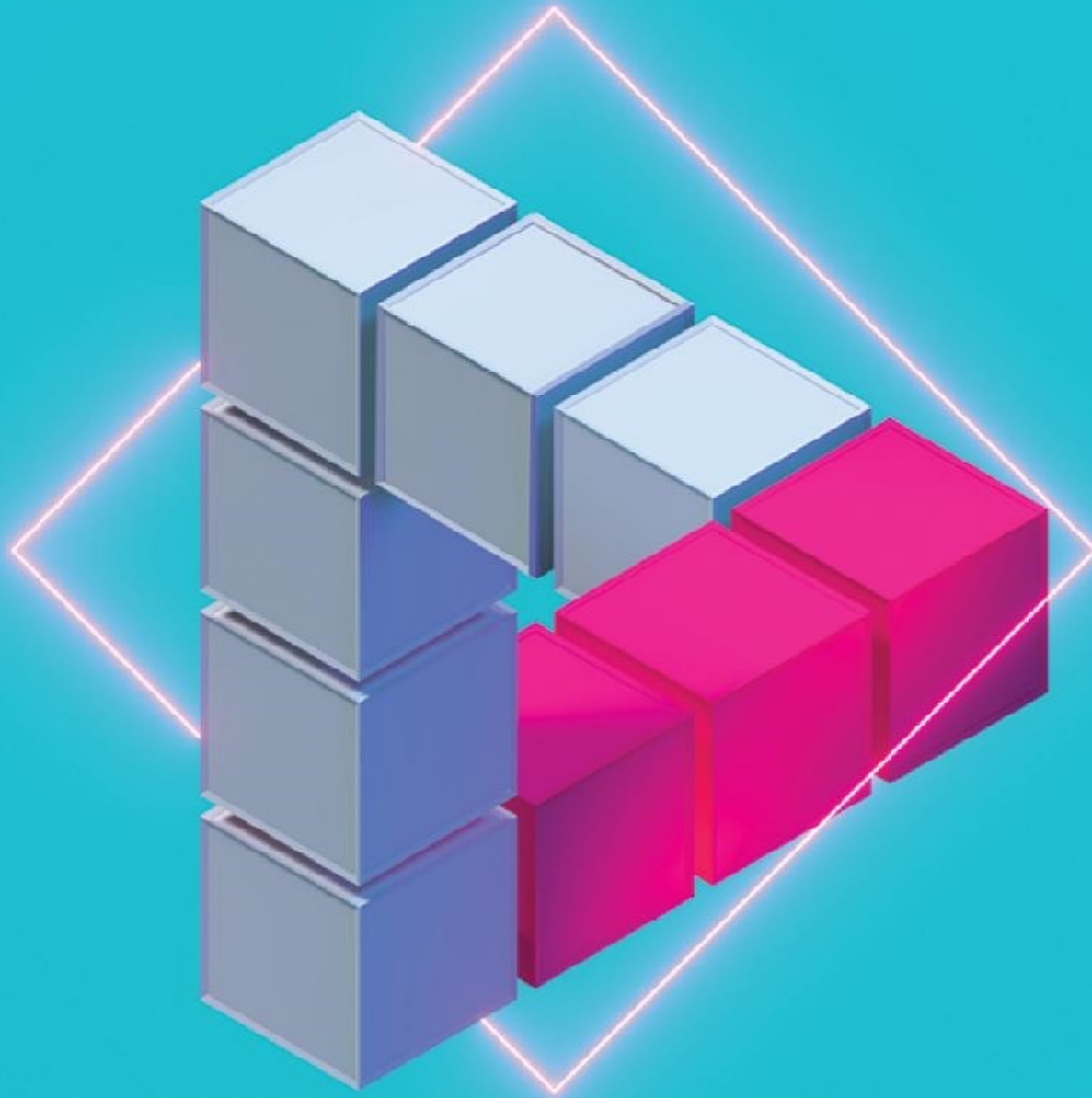
1,249
publications

73 PhD degrees awarded
49% international PhD students

82,507
alumni

3.7% international alumni

STRATEGIC PRIORITIES



NEW FOCUS CENTERS OF EXCELLENCE

- **The Wood Valorization Center of Excellence**
- **The Smart Sea Center of Excellence**
- **The Smart Industry Center of Excellence**
- **The Artificial Intelligence Center of Excellence**
- **The Health and Food Technologies Center of Excellence**
- **The Future Energy Center of Excellence**

CLIMATE
NEUTRAL BY
2035

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Success Stories in Biotech & Aspirations in Protein Engineering

Dr. Priit Eek
Department of Chemistry and Biotechnology

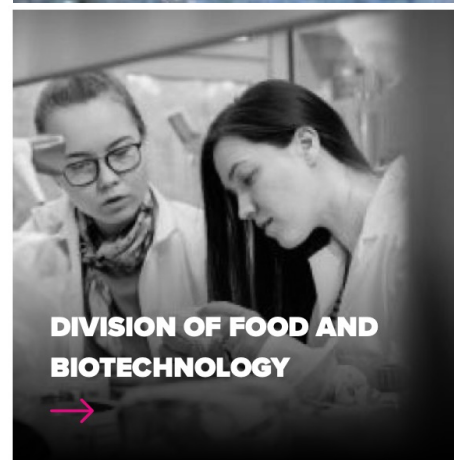
10.10.2024

**TALLINN UNIVERSITY
OF TECHNOLOGY**

DEPARTMENT OF CHEMISTRY AND BIOTECHNOLOGY

Merge of 3 institutes:

- Institute of Chemistry
- Institute of Gene Technology
- Institute of Food Science





Pirjo Spuul
Department Director
Principal Investigator
in Biomedicine

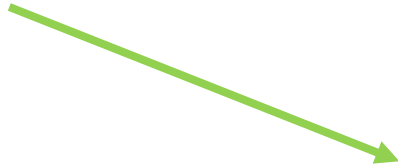
**Dept Chem
& Biotech**



Animal Facility



**Division of Gene
Technology and
Biomedicine**



**Division of Food
and Biotechnology**

**Division of
Chemistry**

- Analytical Chemistry
- Catalysis
- Computational Chemistry
- Industrial Chemistry Laboratory
- Instrumental Analysis
- Supramolecular Chemistry
- Sustainable Chemistry and Engineering
- Synthetic Flow Chemistry Group
- Wood Chemistry

- Automation for Lab-on-a-Chip applications
- Biochemistry of Lipids and Lipoproteins
- Biomedicine
- DNA Replication and Genome Stability
- Immunobiology
- Metalloproteomics
- Microfluidics
- Molecular Neurobiology
- Neuron-Astrocyte Interactions
- Reproductive Biology
- Protein Design
- Smart Analytics

- Food tech and bioengineering
- Food science and technology
- Plant-pathogen interactions and Plant genetics

The department hosts
**161 employees &
48 ongoing projects**
(total 22 MEUR)



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SUCCESS STORIES

RAW EDGE

Ingredients: water, fermented carrot juice (20%), flavour enhancer erythritol, lemon juice, natural flavourings, carbon dioxide.

Lactic acid bacteria (*Lactiplantibacillus plantarum* TENSIA® BioCC OÜ licence) > 10⁷ CFU/ml.

Energy content 46 kJ / 11 kcal

Fats 0 g, of which saturated fatty acids 0 g

Carbohydrates 3.8 g, of which sugars 0.9 g

Protein: 0.1g

Salt: 0g



RAW EDGE – RENEWING THE FOOD SYSTEM

- Fermentation technology developed at **TalTech** combined with bacterial strains discovered and tested at the **University of Tartu** and **BioCC**
- Improving product shelf life and food safety
- Utilizing locally sourced „non-standard“ carrots
- Studies ongoing for next product developments...



Kristel Vene
Researcher, Flavor Scientist
Co-founder of Raw Edge





Petri-Jaan Lahtvee
Professor in Food Tech
and Bioengineering
Co-founder of ÄIO



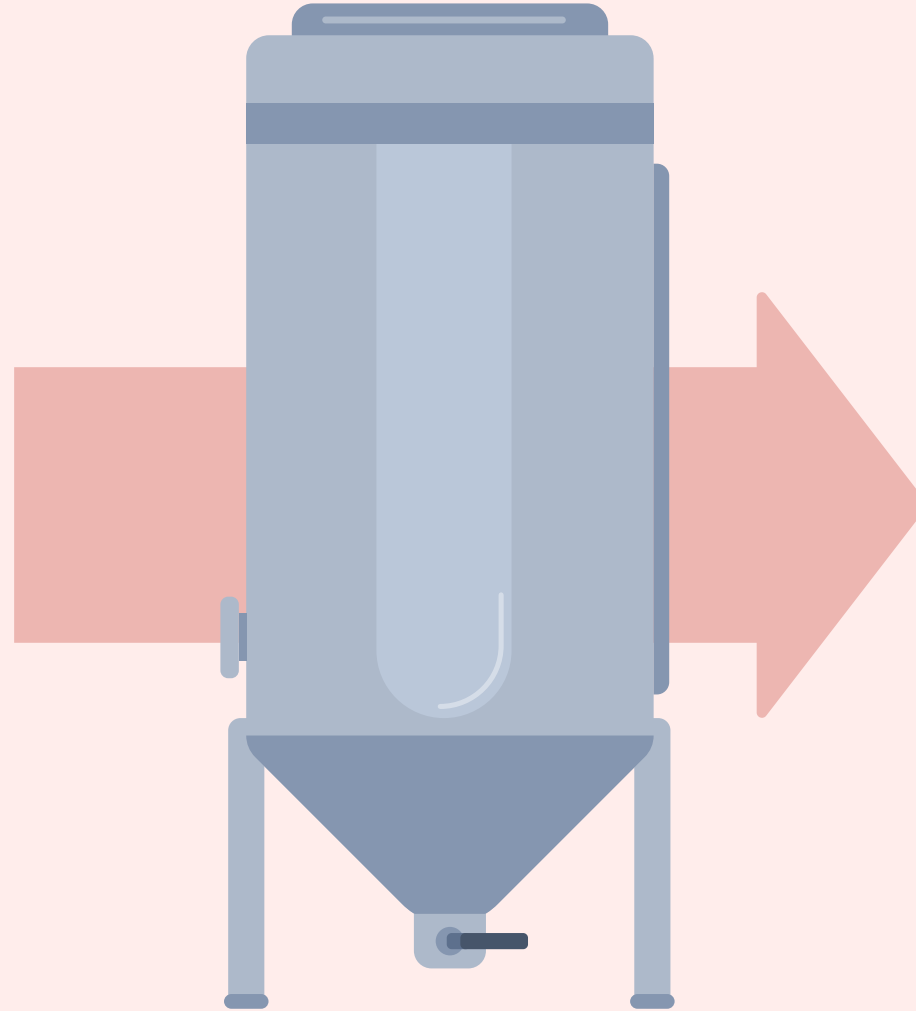
Nemailla Bonturi
Senior Researcher
Co-founder of ÄIO

Future-shaping fats and oils

Sustainability at core



Low-value
agricultural/industrial
sidestreams



Robust bioprocess



High-value
products

Encapsulated oil



Perfect for: Bakery • Vegan patties • Creamy sauces • Nutritious toppings • Confectionary

RedOil

Naturally packed with carotenoids
and antioxidants



Perfect for: Actives • Skin care • Hair care

Buttery fats



Substitute for: Animal fat
Coconut fat • Cocoa butter



**TF
TAK**



Passionate about Food Research and Biotechnology



Bioprocess optimization

- Precision fermentation
- Cultivation of bacteria, yeast, fungi
- Microbial communities research
- In vitro gut modelling



Food science

- Functional foods and beverages
- Meat alternatives
- Alternative proteins
- Dairy alternatives
- Sensory and consumer science
- Packaging and shelf-life



Analytics and metagenomics

- Chemical (GC-MS, GC-O, LC-MS, UPLC-QQQ, etc.)
- Physical (aw, rheology, TPA, SEM, etc.) analyses
- Microbiological
- Sensory analyses



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PROTEIN DESIGN

DEVELOPING NOVEL PROTEIN FOOD ADDITIVES



PROBLEM

Food industry needs alternatives for current food additives based on petrol chemistry or animal sources.

SOLUTION

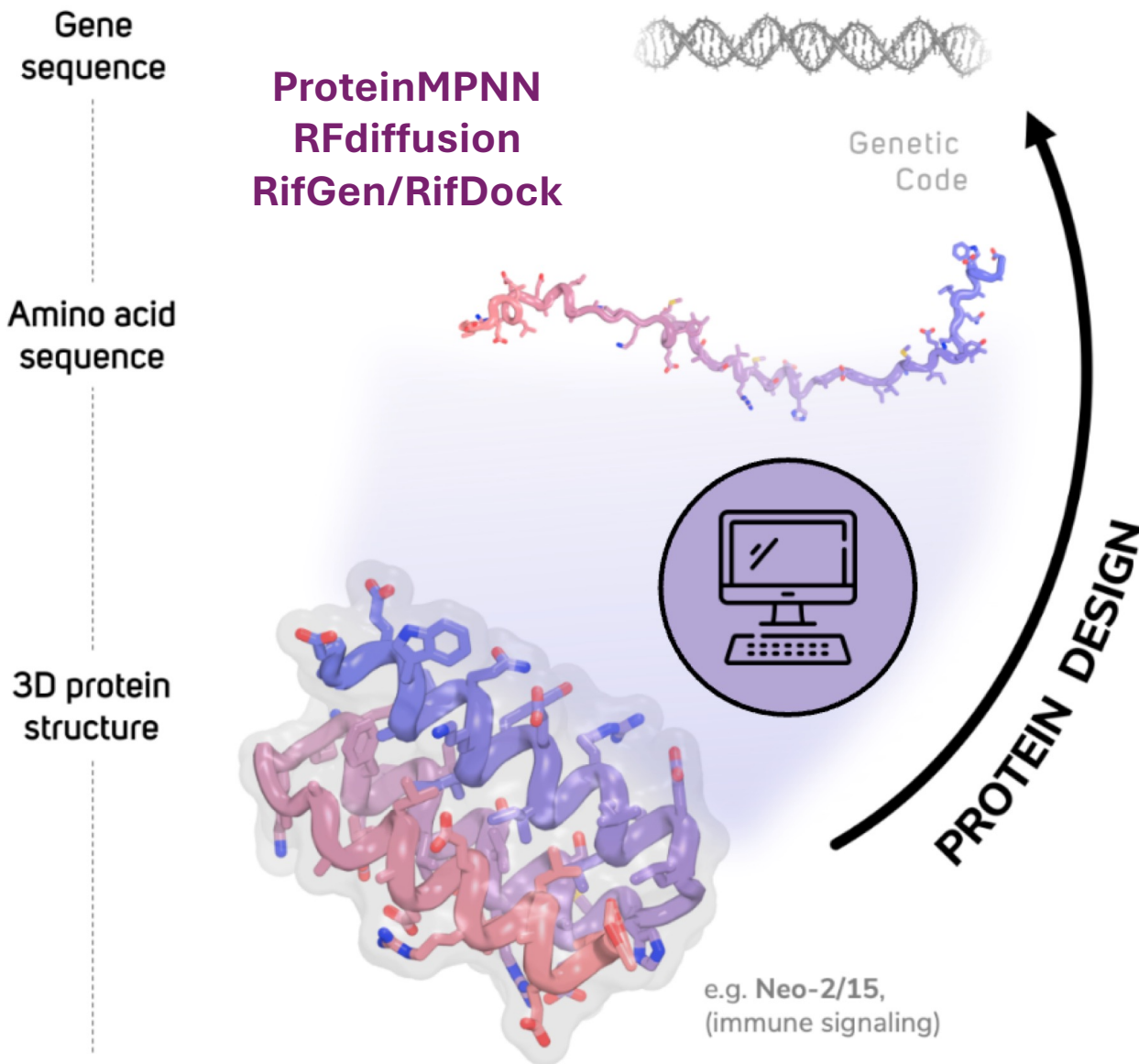
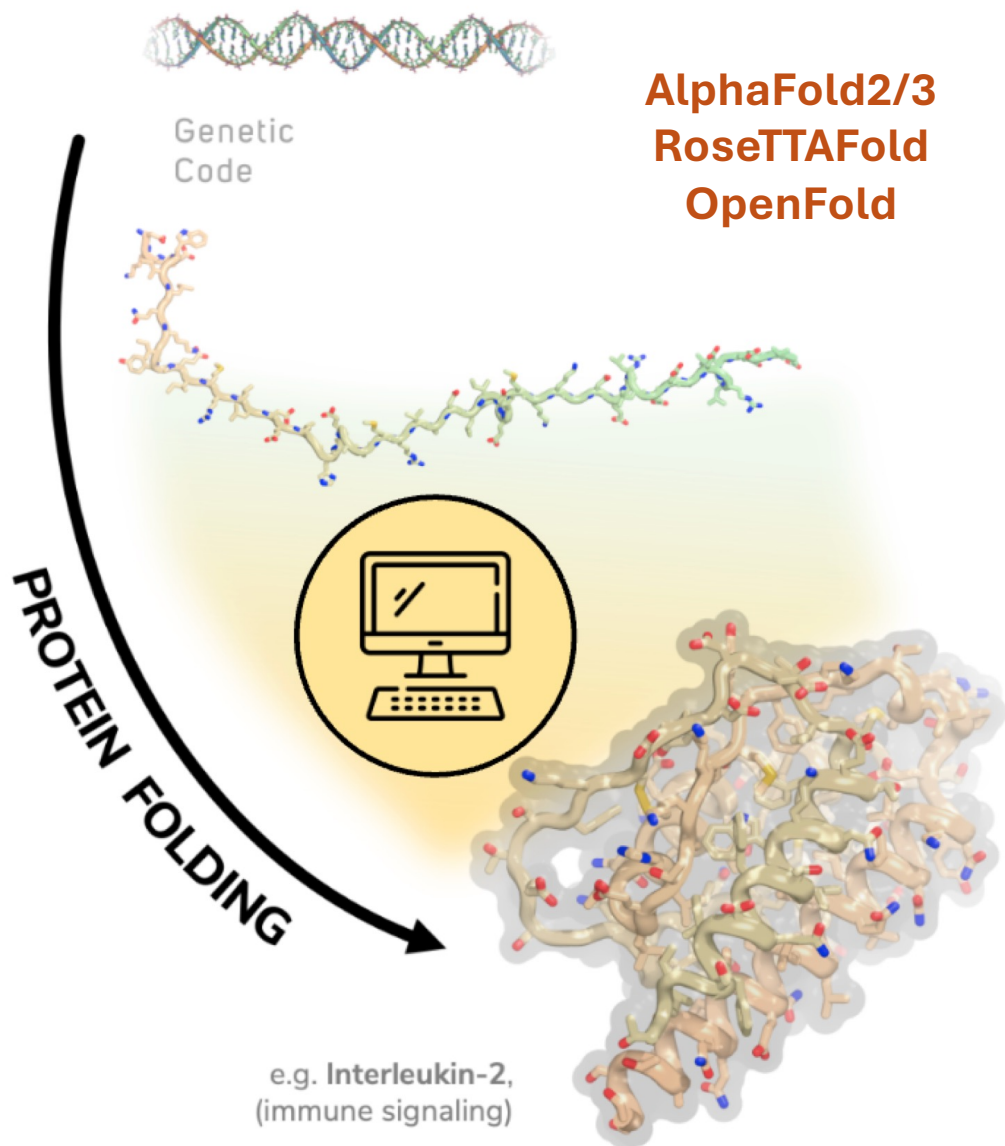
Nature offers proteins with various techno-functional properties that can be used as additives.

CHALLENGE

Natural sources are not sustainable and natural proteins have suboptimal properties.

GOAL

Develop novel protein additives with improved properties using cutting-edge protein design methods, and precision fermentation bioprocesses for production and applications.



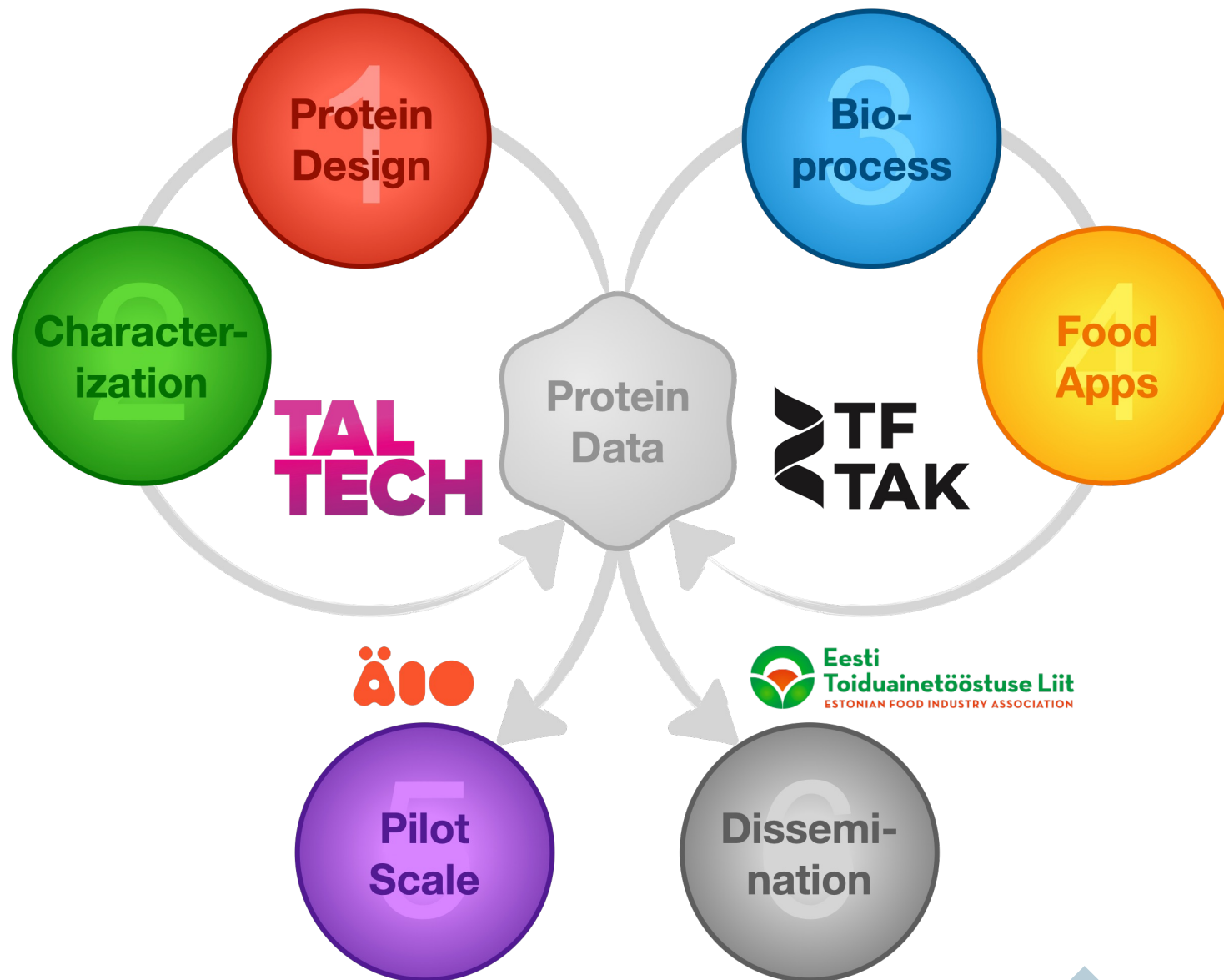
Gene sequence

Amino acid sequence

3D protein structure

3D protein structure







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OF TECHNOLOGY

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