SayFood

Food & Bioproduct Engineering

JRU 0782 Paris-Saclay Food and Bioproduct Engineering

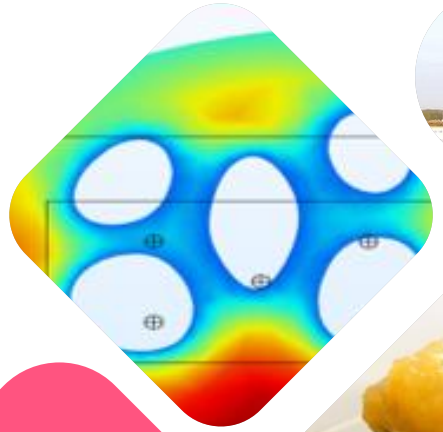
AgroParisTech
Talents d'une planète soutenable

INRAE
la science pour la vie, l'humain, la terre

université PARIS-SACLAY

Campus Agro Paris-Saclay (CAPS)
22 place de l'Agronomie
91120 Palaiseau

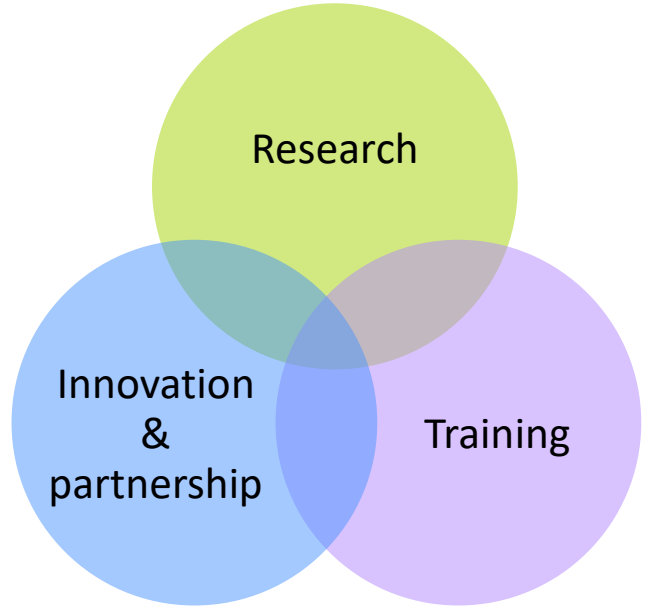





Who are we?

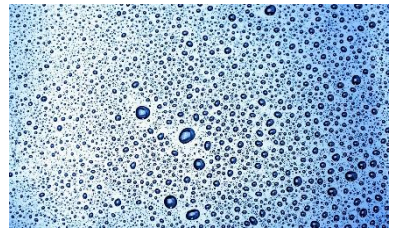
JRU AgroParisTech – INRAE created in 2020 to become a centre for research in food and bioproduct engineering

- Reaching a critical size for greater visibility
- Focused on partnership and innovation
  (*technological platform, FoodInn'Lab, link with industrials*)
- Strong link to training, attractive to students





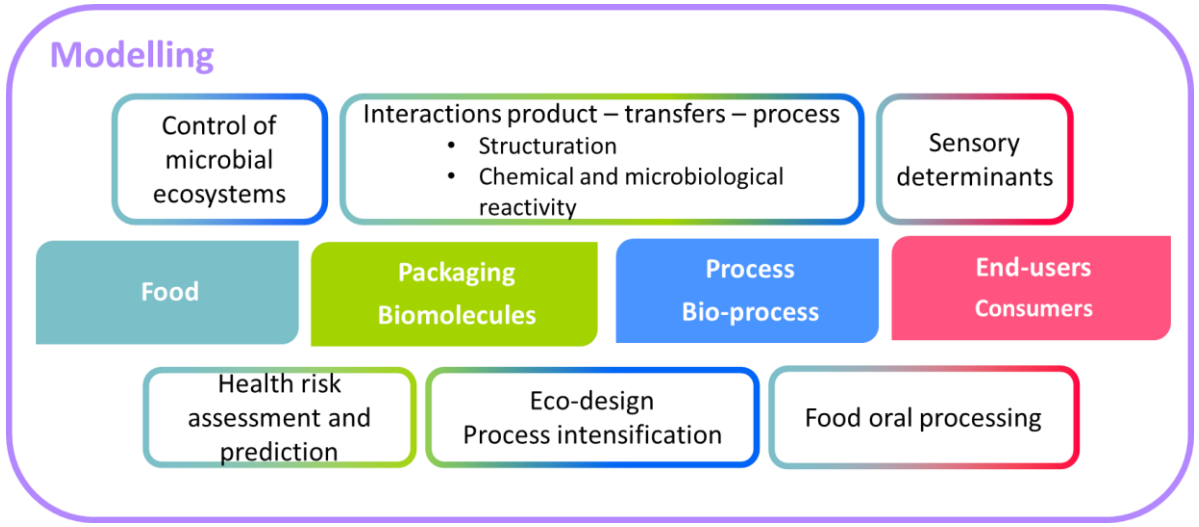





Our purpose

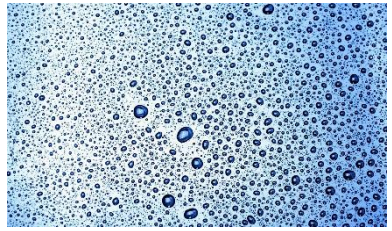
- Develop multidisciplinary mechanistic approaches for the bio-economy & for the development of new healthy and sustainable food systems

- Contribute to product and process innovation that takes into account upstream production constraints and the needs and expectations of consumers and users.










SayFood
Food & Bioproduct Engineering

5 multidisciplinary research teams

CoMiAl

Food microbial ecosystems

ProBioSSep

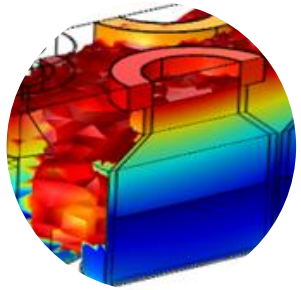
Microbial processes, stabilization, separation

IHAC

Human-food interactions, from conception to consumption

GéPro

Product engineering



MIC

Modeling and computational engineering

Biochemistry

Physico-chemistry

Microbiology

Sensory analysis

Chemistry

Genomics

Consumer sci.

Biochemistry

Applied mathematics

Process engineering

AgroParisTech
Talents d'une planète soutenable

INRAE
la science pour la vie, l'humain, la terre

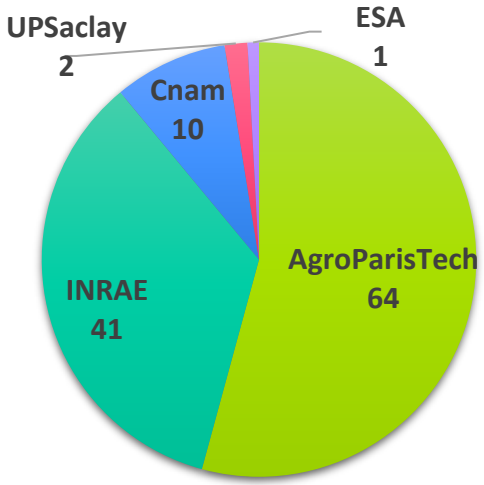
université PARIS-SACLAY

121 tenure staff

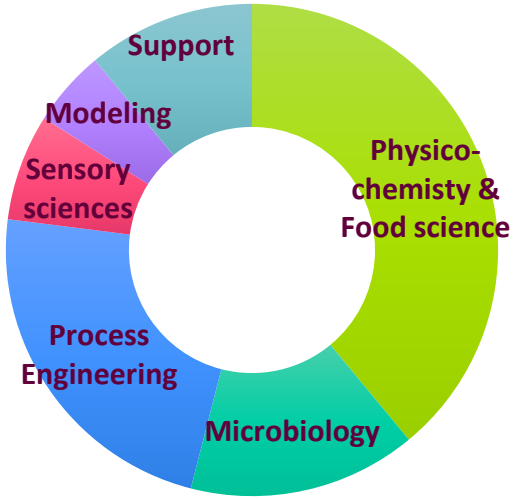
- ✓ 63 researchers
- ✓ 58 engineers & technicians

31 PhD students / 20 contractual staff

Trainees



Disciplines



5 "laboratory areas"

- Chemistry-biochemistry
- Physico-chemistry / microscopy
- Microbiology
- Sensory analysis
- Instrumented manipulations

1 Technological plant (2360 m²)

- Pilots area
- Fermentation area
- Food grade area

1 experimental restaurant

SayFood

Food & Bioproduct Engineering

Technological Pilot Plant

- **2720 m²**
- **~50 instrumented pilots**
- **Missions**
  - Research – Training – Transfer (start-ups; industrials)
  - Development and instrumentation of prototypes and pilot devices
  - Carrying out tests and studies
- **Specificities**
  - Process engineering approach: bioprocesses & separations - drying - thermo-mechanical processes
  - Product design and manufacture (food sector)
  - Coupling processes - products – functionalities
  - Instrumentation and industrial IT (measurement, control, automation

New platforms

- **MetaVolFood**
  - Part of the Challenge *Ferments for the Future*
  - Targeted and non-targeted analysis of metabolites and aromatic compounds in fermented food matrices + chemometrics

- **Experimental restaurant**
  - Developed in cooperation with Paris univ restaurants, with PNCA(nutritionists)-PSAE(economists)
  - Study of consumer behavior and its determinants in meal situations, design and evaluation of interventions to promote changes

CoMiAl

CoMiAl

Food microbial ecosystems

Biochemistry

Microbiology

Genomics

Understand

- Changes in microbial communities during manufacturing / storage
- Impact on quality (organoleptic / sanitary)

Cheese, milk product
Plant products

Aim at developing knowledge on

- Microbial community structure, microbial flows
- Adaptation of species to their environment
- Expression of functions of interest

Approaches

- Physiology and metabolic activity of pure strains
- Multi-omics on fermented food

GéPro

Product engineering

Physico-chemistry

Chemistry

Biochemistry

Food process engineering

Focused on the impact of formulation and thermo-mechanical processes on

- Structuration of products
- Chemical and enzymatic reactivity
- Building of the quality

for food and cosmetic products & bio-based packaging

Aim at

- Developing new products from alternative sources
- Re-designing formulations and technological routes for clean label products or for target populations
- Re-thinking transformations as part of the reterritorialization of certain activities
- Reclaiming by-products for a new circular economy model

IHAC

IHAC

Human-food interactions, from conception to consumption

Physico-chemistry

Sensory analysis

Consumer sci.

Food process engineering

Focused on interactions between humans and food (taking diversity into account) for

- Conception of new products
- Supporting changes in behavior
- Making recommendations for healthier et more sustainable diets

Aim at

- Developing tools and methods for measuring sensory preferences and behaviors
- Developing tools and methods for conception
- Understanding food oral processing (FOP)

Approaches

- Sensory analysis, consumers approaches
- Virtual reality
- Eco-conception (LCA…)
- FOP instrumented tools (artificial tongue, *in vitro* digester…)

ProBioSSep

ProBioSSep

Microbial processes, stabilization, separation

Physico-chemistry

Microbiology

Process engineering

Focused on bioprocesses and separation processes

- For the production of microbial biomass and molecules of interest
- Targeting food and non-food products within a framework of sustainability
- And reducing the impact of processes (energy, water, waste)

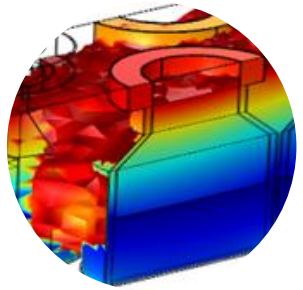
Aim at designing and optimizing production/stabilization and production/separation processes, taking into account

- Product quality
- Process performances
- Environmental impact

Approaches

- Study of mechanisms with in situ/off-line characterizations
- Modeling
- Multi-criteria optimization

ModIC



MIC

Modeling and engineering by calculation

Applied mathematics

Food process engineering

Aim at developing modeling tools

- for understanding highly coupled phenomena at different scales
- for guiding engineering solutions (choice of packaging materials, optimizing process conditions…)
- For risk assessment in packaging in contact with food