ADVANCED COURSE

Cellular Agriculture - Precision fermentation and cultured meat

11-13 November 2026

Marcel Ottens
René Wijffels
Lorenzo Moroni
Joshua Flack

AIM OF THE COURSE

In Cellular Agriculture, biotechnological methods are used to produce traditionally animal derived products. In this rapidly developing field there are two main approaches: either components are produced via precision fermentation using genetically modified micro-organisms, or cellular products such as meat are grown in bioreactors. This technology can play a role in the protein transition by diversifying our protein sources. We are on the verge of introducing cellular agriculture products to the market, whilst at the same time tackling technological and societal challenges.

The aim of the course is to familiarize participants with potential CellAg products and the key considerations and disciplines needed to design production processes. The multidisciplinarity is reflected in the program, where teachers from universities and companies join forces to offer a selection of theory and practice. In this way, the course will provide an intensive overview of the state of the art and the necessary link between the various disciplines. All teachers of this course are experts in their topic and have been selected for their outstanding teaching qualities. The participants are invited to engage in active discussions with the teachers.

This very personal approach is underlined by the fact that the maximum number of participants is set to 35. After the course the participants will be well educated on the critical disciplines that encompass CellAg. Additionally, the participants will have made acquaintances with experts in the fields and among each other.

BioTechDelft
POSTGRADUATE EDUCATION

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TU Delft

COURSE DESCRIPTION

This course is intensive and has a multidisciplinary approach. To ensure active participation by those attending, a combination of theoretical (lectures) and practical (small group case design) work is offered. Some online preparatory materials will be provided to ensure all have the same basic knowledge.

LECTURES

The lectures are planned such that we start with building our understanding of the final Cellular Agriculture product that can be consumed. Then we will cover the specifics of the cells and establishing production strains (microbial) / cell lines (animal). The second day of the course will focus on the main aspects of designing and controlling effective production processes, and quantifying economical and environmental benefits over traditional production methods. The final course day will revolve around legal and societal aspects of introducing a novel food. A number of industry cases will be discussed to allow reflection of the shared theory versus "real life" experiences.

EXERCISES

To actively incorporate the offered theory, a small-group exercise will be provided that runs through the three course days. It will end with presentations and a panel discussion on the final course afternoon. The course will be given in English.

WHO SHOULD ATTEND?

This Advanced Course is aimed at professionals (MSc, PhD, or equivalent experience) in biotechnology, food production, or biochemical process engineering with a basic working knowledge of the other disciplines. The course is aimed at those active in academia and industry who seek to update their knowledge on Cellular Agriculture. Both technical and societal topics will be covered in the course. In addition, this Advanced Course is an elective in the two-year postgraduate programs of Delft University of Technology.

COURSE BOARD

Marcel Ottens
Josh Flack
Bioprocess Engineering
Department of Biotechnology
Delft University of Technology
Delft, the Netherlands

René Wijffels
Bioprocess Engineering
Wageningen University & Research
Wageningen, the Netherlands

Lorenzo Moroni
Biofabrication for Regenerative Medicine
MERLN Institute for Technology-Inspired Regenerative Medicine
Maastricht University
Maastricht, the Netherlands

TU DELFT

Cees Haringa
Marieke Klijn
Marcel Vieira-Lara

COURSE COORDINATION

Yvonne van Gameren
Jenifer Baptiste
BioTech Delft, Delft University of Technology
Department of Biotechnology
Delft, the Netherlands

LECTURERS

Mark Bisschops
Zekun Fan
Dirk Martens
Francesco Montanari
Marleen Onwezen
Wageningen University and Research
Wageningen, the Netherlands

Will van den Tweel
Those Vegan Cowboys
Gent, Belgium

Sjef Cornelissen
dsm-firmenich
Delft, the Netherlands

David Kilian
MERLN, Maastricht University,
Maastricht, the Netherlands

Laurens Antuma
Vivici
Leiden, the Netherlands

Nicole Imholz
CE Delft
Delft, the Netherlands

Niusha Nikravesh
Mosa Meat
Maastricht, the Netherlands

PROGRAM

WEDNESDAY 11 NOVEMBER 2026

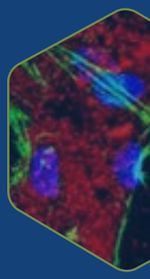
Theme: Setting the scene
08:45 Registration
09:00 Introduction: Cellular Agriculture, course, and participants
René Wijffels/Marcel Ottens
09:30 SotA: Industry overveiw (PF/CM)
Josh Flack
10:15 Food science and formulation (CM)
Zekun Fan
11:00 Microbial casein (PF)
Will van den Tweel
11:45 Group picture & Lunch
12:45 Microbial strain engineering (PF)
Laurens Antuma
13:30 Animal cell line development (CM)
Josh Flack
14:30 Medium development (PF/CM)
Marcel Vieira-Lara
15:15 Biomaterials & Biofabrication (CM)
David Kilian
16:15 Group work on assigned design case

THURSDAY 12 NOVEMBER 2026

Theme: Production processes at commercial scale
09:00 Scale-up (PF)
Sjef Cornelissen
09:45 Scale-up animal cell culture (CM)
Dirk Martens
10:45 Group work on assigned design case
12:00 Microbial Strain Engineering (PF)
Mark Bisschops
12:45 Lunch
13:30 Downstream processing (PF/CM)
Marcel Ottens
14:15 Regulatory (PF/CM)
Francesco Montanari
15:15 Group work on assigned design case
16:30 LCA/TEA (PF/CM)
Nicole Imholz
19:30 Dinner and drinks

FRIDAY 13 NOVEMBER 2026

Theme: Legal and societal apsects
09:00 Reactor Design/Dynamics(PF/CM)
Cees Haringa
09:45 Analytics (PF/CM)
Marieke Klijn
10:45 Group work on assigned design case
12:00 Lunch
12:45 Consumer Acceptance (PF/CM)
Marleen Onwezen
13:30 Industry case Cultivated Meat
Niusha Nikravesh
15:30 Group work: Case presentations
17:00 Closure



LOCATION

The course will be held at the
Delft University of Technology
Department of Biotechnology
Van der Maasweg 9
2629 HZ Delft, The Netherlands

COURSE REGISTRATION

Please register via the website to attend the course. Applicants will be handled in order of the date of receipt.

COURSE FEE

The course fee can be found on the website. The fee includes course materials, lunches and the course dinner on Thursday. The fee does not cover other meals and lodging.

When the number of participants is too low to have a fruitful course, BioTech Delft will cancel the event no later than six weeks before the start of the course. The course fee will be reimbursed within three weeks after cancellation.
In case a speaker will not be able to present his/her lecture due to unforeseen circumstances, BioTech Delft will arrange an equivalent replacement.

The complete course book will be supplied at the start of the course.

BioTech Delft organises biotechnology education at postgraduate level. BioTech Delft closely cooperates with the department of Biotechnology of Delft University of Technology. Since its foundation, in 1987, BioTech Delft has very successfully organised various types of postdoctoral education.

Currently BioTech Delft offers Advanced Courses given each year, covering the multidisciplinary spectrum of biotechnology. The courses have a long track-record dating back to 1988.

- *Microbial Physiology and Fermentation Technology (1988)*
- *Downstream Processing (1989)*
- *Biocatalysis and Protein Engineering (1999)*
- *Bioprocess Design* (2014)*
- *Modelling and Computation for Micro-organisms in Bioprocesses (2018)*
- *Multi-Omics approaches for Improvement of Industrial Microbes (2020)*
- *Cellular Agriculture: Precision fermentation and cultured meat (2024)*
- *EPS for resource recovery (2025)*
- *Biopharmaceutical Bioprocessing (2025)*
- *AI Fundamentals for Biotechnology (2026)*

** in partnership with Wageningen University & Research*

FURTHER INFORMATION

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