Training School	**GUT MICROBIOTA MODELS: basics in experiment set up, model selection, data capture, data analysis. Cesena (IT) 22-24 of September 2025**
Trainer 	**Andrea Gianotti, DISTAL, University of Bologna.** andrea.gianotti@unibo.it ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA
Title of training contribute	The INFOGUT Project: from building the basement up to opportunities and perspectives.
Goals	The lesson aims to equip students with knowledge on how to create a consortium and build up a COST project and make them aware of grant opportunities and professional development.
Objectives	By understanding the foundational goals and structure of the INFOGUT platform and COST projects. Learn how to create a research consortium and navigate grant opportunities, including STSMs. Identifying key partners, leadership roles, and future perspectives for professional development.
Learning outcomes	At the conclusion of this session, students will be expected to: i) provide an overview of the INFOGUT platform and its foundational purpose; ii) Outline the organizational structure, including key leaders and partner networks; iii) Explore the main activities carried out and potential future developments, including STSM and other grant opportunities.

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Trainer 	**Lorenzo Nissen, DISTAL - University of Bologna.** lorenzo.nissen@unibo.it ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA
Title of training contribute	Parameters & Sample Processing of Batch GM Models with laboratory practice.
Goals	The lesson aims to equip students with knowledge and skills to understand, prepare, and operate Batch GM Models effectively.
Objectives	By the end of the lesson, students will be able to: i) Understand key terms related to Batch GM Models; ii) Describe volunteer recruitment and inoculum preparation steps; iii) Identify main components of a Batch GM Model; iv) Outline sampling and sample processing for omics analyses; v) Explain how to set up and operate a Batch GM Model.
Learning outcomes	Trainees will be able to clearly explain key parameters affecting Batch GM Models, demonstrate practical skills in inoculum preparation and volunteer recruitment, analyze critical components during model setup, apply correct sampling and sample processing techniques for omics analyses, and confidently manage the operation of a Batch GM Model experiment.

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Trainer 	**Thomas Hitch, Medizinische Mikrobiologie, University of Achen.** thitch@ukaachen.de UNIKLINIK RWTH AACHEN
Title of training contribute	Synthetic Communities: The creation and use of SynComs to study the gut microbiota.
Goals	To understand how SynComs are created, why they are useful, and their benefits and limitations compared to complex microbiota.
Objectives	The lecture will introduce the concept of SynComs, why they exist, their history, and their complexity. Then, the major methods by which SynComs are created, and the limitations of each approach, as well as their benefits, will be discussed. Use-cases of existing SynComs will be made throughout to highlight their application in research. As a case study, a variety of strains, as well as a specific ecosystem will be provided. The students will aim to create a suitable SynCom for the ecosystem based on the information provided. We will go over which strains were selected, and why.
Learning outcomes	Understanding what SynComs are, how SynComs are selected, and how to evaluate which SynCom is most appropriate for their use-case.

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Trainer 	**Ludovica Marinelli, Ghent University, Belgium.** Ludovica.Marinelli@UGent.be
Title of training contribute	Host-bacteria interaction mechanisms: lessons from *in vivo* studies, translated to *in vitro* approaches.
Goals	Acquire basic knowledge of host-bacteria interaction along the human gastrointestinal tract, and of experimental approaches used to investigate these mechanisms.
Objectives	To develop a foundational understanding of host–bacteria interactions along the human gastrointestinal tract, with emphasis on the role of gut microbiota and host parameters. The session also aims to familiarize students with experimental approaches used to investigate these mechanisms, enabling them to describe, identify, and explain key features of host–microbiota relationships.
Learning outcomes	Upon completing this session, students will be able to: 1) Describe key features of gut microbiota along the gastrointestinal tract; 2) Identify key host parameters along the gastrointestinal tract; 3) Explain some main mechanisms of host–microbiota interactions in the human gut; 4) Outline basic knowledge on experimental approaches to study these interactions.

1st INFOGUT TRAINING SCHOOL, 22-24 September 2025,
Campus of Food Science – *Alma Mater Studiorum*-University of Bologna, Cesena (FC), Italy

Training School	**GUT MICROBIOTA MODELS: basics in experiment set up, model selection, data capture, data analysis. Cesena (IT) 22-24 of September 2025**
Trainer 	**Harsh Mathur, Teagasc Food Research Centre, Fermoy, Co. Cork, Ireland.** mailto:harsh.mathur@teagasc.ie Agriculture and Food Development Authority
Title of training contribute	The use of the microMatrix bioreactor platform as an *ex vivo* model of the human distal colon.
Goals	-To give a brief introductory lecture on the microMatrix bioreactor platform and its applications as an *ex vivo* model of the humam distal colon; -To deliver a practical demonstration of a mock faecal fermentation experimental set up, assembly of the microMatrix cassette, top plate, clamps and filter bars; -To supplement this practical demonstration with training videos prepared in Teagasc with the actual microMatrix unit.
Objectives	-To give new students babd researchers an intriduction to the microMatrix bioreactor system, esiecialiy those who are unfamiliar with the system; -In addition, to supplement training for researchers who are already using the microMatrix system in their research institutes; -Finally, to have a Question and Answer session where any specific questions and troubleshooting steps can be discussed in detail e.g. issues relating to microbial blooms in batch model faecal fermentation experiments ising the microMatrix system as an example.
Learning outcomes	-To ensure that every student and researcher learns something useful about the microMatrix bioreactor platform as an example of a batch model system for faecal fermentation experiments. This can be achieved through the introductory lecture prior to the practical demonstration; -To ensure that every student and researcher develops an understanding of the assembly of the microMatrix cassette, top plate, clamps and filter bars through a practical demonstration.

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Training School	**GUT MICROBIOTA MODELS: basics in experiment set up, model selection, data capture, data analysis. Cesena (IT) 22-24 of September 2025**
Trainer 	**Alise Ponsero, Quadram Institute of Biosciences (UK).** Alise.Ponsero@quadram.ac.uk
Title of training contribute	Basics of Bioinformatics Applied to GM Models
Goals	Introduction to pre-processing, annotation and analysis of metagenomes derived from colon model experiments; Introduce participants to the fundamental concepts of metagenomic analysis in the context of gut microbiome research; Introduce participants to bioinformatics tools and workflows for metagenomic data processing
Objectives	1) Enable participants to critically evaluate and interpret metagenomic results from colon fermentation experiments; 2) Demonstrate best practices for quality control and statistical analysis of microbiome compositional data
Learning outcomes	By the end of this workshop, participants will be able to: i) Understand the difference between 16S rRNA and WGS metagenomic datasets and their respective applications in gut microbiome research; ii) Understand the main approaches for preprocessing and quality control for metagenomic datasets, including read trimming, adapter removal, and contamination screening; iii) Explore the main taxonomic and functional annotation methods for metagenomes, including reference-based and de novo assembly approaches; iv) Explore statistical methods to identify compositional changes in the microbiome during experimental fermentation, including diversity metrics and differential abundance testing; v) Interpret quality control metrics and recognize common issues in metagenomic data; vi) Select appropriate bioinformatics tools and databases for taxonomic classification and functional annotations; vii) Understand the statistical considerations specific to compositional microbiome data (e.g., zero-inflation, compositionality constraints); viii) Critically evaluate the biological significance of metagenomic findings in the context of colon model experiments

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Trainer 	**Francesco Capozzi, DISTAL University of Bologna.** francesco.capozzi@unibo.it ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA
Title of training contribute	Using nuclear magnetic resonance to extract metabolomic information from biological samples for fecal metabotype classification
Goals (broad statments)	The training will provide insights into the usefulness of metabolomic tools in understanding the physiological phenomena underlying digestion in the colonic tract of the intestine.
Objectives (specific)	Have training on (i) sample preparation and the effect of sample nature on spectroscopic data quality, (ii) spectrum interpretation and metabolite identification, and (iii) data preparation for multivariate analysis
Learning outcomes	Understand the quality of metabolomic information needed to obtain a correct description of the biological system under investigation and how misleading models can be obtained if their robustness is not verified

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Trainer 	**Irene Chiesa, Department of Information Engineering, Research Center E. Piaggio - University of Pisa** irene.chiesa@ing.unipi.it
Title of training contribute	MICRO-B: a gut microenvironment-mimicking bioreactor for the human gut microbiota in vitro culture
Goals	Describe the development pathway of dynamic bioreactors for in vitro cultures. Present MICRO-B, a gut microenvironment-mimicking bioreactor for the human gut microbiota and intestinal epithelium in vitro culture
Objectives	The objective of our lecture is to instruct the participants on the main requirements and operational steps to develop a dynamic bioreactor for relevant in vitro cultures in tissue engineering and regenerative medicine. As a case study, MICRO-B bioreactor's development steps and its use in the human gut microbiota and the intestinal epithelium contexts will be shown.
Learning outcomes	Knowledge of the development steps required for the fabrication of a bioreactor for relevant in vitro cultures and tissue engineering applications. Use of microB dynamic culture bioreactor

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Trainer 	**Edoardo Capuano, Wageningen University and Research** edoardo.capuano@wur.nl
Title of training contribute	In vitro dynamic models of colon fermentation
Goals	Present the state-of-art of existing in vitro dynamic models of colon fermentation, difference in key parameters and settings, strength and limitations of each model
Objectives	In this contribution, a number of widely used in vitro dynamic models of colon fermentation are presented and discussed. This contribution will include general information on the fundamental operational principles of a dynamic model of colon fermentation, the main characteristics of each model, the difference in key parameters and settings, strength and limitations of each model and how this knowledge can be used to select the appropriate model depending on the research question. Specific examples will be presented on the use of (some) of the models, taken from the relevant scientific literature or the research work of the presenter.
Learning outcomes	i) To understand the fundamental design and operational principles widely used in vitro dynamic models of colon fermentation; ii) to compare and evaluate the strengths, limitations, and key parameters of different colon fermentation models; iii) Apply knowledge of model characteristics to justify the selection of an appropriate in vitro colon fermentation model for a given experimental scenario or scientific objective.

Training School	**GUT MICROBIOTA MODELS: basics in experiment set up, model selection, data capture, data analysis. Cesena (IT) 22-24 of September 2025**
Trainer 	**Jürgen Zentek, Institute of Animal. Nutrition, Freie Universität Berlin.** Juergen.Zentek@fu-berlin.de
Title of training contribute	Advances in In Vitro Digestive Models for monogastric animals
Goals	This lecture explores recent advances in in vitro models for studying digestion in monogastric animals. Students will learn about key model types, their applications in nutrition research, and innovations such as microbiota integration and organoid use. The lecture also highlights model limitations and their relevance to in vivo conditions.
Objectives	This lecture aims to equip students with a basic understanding of in vitro digestive models for monogastric animals. They will learn to describe different model types, recognize recent advancements, and understand how these models are used to study digestion. Students will also be encouraged to reflect on the strengths and limitations of in vitro approaches compared to in vivo methods.
Learning outcomes	By the end of this lecture, students will be able to identify key in vitro models used in monogastric digestion research, explain recent technological advances, and understand their applications in studying nutrient digestibility. They will also be able to discuss the relevance and limitations of these models and evaluate their suitability for different research questions.

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Trainer 	**Sabrina Tamburini, Department of Molecular Sciences and Nanosystems, University of Venice, Ca' Foscari.** sabrina.tamburini@unive.it Università Ca' Foscari Venezia
Title of training contribute	Advanced Microbial Genomic Sequencing Analysis.
Goals	To provide students with comprehensive knowledge in applying advanced genomic analysis techniques to in vitro gut microbiota model systems, enabling them to understand microbial community structure, function, and dynamics in controlled laboratory environments.
Objectives	This lesson aims to introduce students to state-of-the-art microbial genomic sequencing technologies specifically applied to microbiota research, with particular emphasis on their implementation in gut microbiota studies. Students will gain detailed understanding of library construction protocols and quality control procedures essential for 16S rRNA, metagenomic and transcriptomics sequencing applications, ensuring robust and reproducible results. Applications of genomic profiling techniques in characterizing microbial community diversity and functional capacity will be explored, highlighting how these approaches can reveal the intricate relationships between microbial composition and metabolic potential in controlled laboratory environments.
Learning outcomes	- Evaluate appropriate genomic analysis methods for different research questions in gut microbiota studies; - Interpret metagenomic and 16S rRNA sequencing results to assess microbial community composition and functional profiles; - Design experimental protocols for genomic analysis of gut microbiota model systems; - Critically assess the advantages and limitations of different genomic approaches in microbiota research.

Training School	**GUT MICROBIOTA MODELS: basics in experiment set up, model selection, data capture, data analysis. Cesena (IT) 22-24 of September 2025**
Trainer 	**Costanza Daddi, Department of Information Engineering, Research Center E. Piaggio - University of Pisa** costanza.daddi@phd.unipi.it UNIVERSITÀ DI PISA
Title of training contribute	MICRO-B: a gut microenvironment-mimicking bioreactor for the human gut microbiota in vitro culture
Goals	Outline the basic technical steps to follow in the design and fabrication of in vitro culture devices. Presentation of a case study, MICRO-B.
Objectives	Provide the basic theoretical and practical knowledge for the development of tools and devices that will be used in in vitro applications to generate relevant in vitro models of target organs/tissues. Demonstrate how the presented case study bioreactor (MICRO-B) works in the gut microbiota/intestinal epithelium in vitro modelling scenario.
Learning outcomes	Basic knowledge of the technical challenges in in vitro modelling of tissues and organs. Awareness of the necessary engineering steps to follow for advanced in vitro tools development. Use of a dynamic culture bioreactor (MICRO-B).