Jena School for Microbial Communication
Graduate School of Excellence

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Title PhD Project:

Deciphering microbiome-enteric nervous system interactions in sepsis
February 2026 - Present

Main Research Interests

- **Microbiome-ENS axis in sepsis:** Elucidating mechanistic links between sepsis-induced gut dysbiosis and enteric nervous system (ENS) dysfunction;
- **Microbial metabolic pathways:** Identifying microbiome-derived metabolites and metabolic pathways that modulate ENS signaling, intestinal inflammation, and neuroimmune responses;
- **Neuro-immune-microbe interactions**: Exploring local interactions among gut microbial communities, immune cells, and the ENS, including mechanisms that may precede or contribute to the central nervous system (CNS) dysfunction;
- **Microbiome-targeted interventions:** Developing microbiome-based therapeutic strategies to prevent or mitigate sepsis-associated neurological complications, delirium and long-term cognitive impairment.

Methodological Experience

- Human induced pluripotent stem cell (hiPSC) differentiation into enteric neurons and glia
- Development of immunocompetent gut-on-chip models
- Design and assembly of synthetic microbial communities (SynComs)
- Genome-scale and community metabolic modeling
- Prediction of microbial interactions, cross-feeding, and metabolite production

Curriculum Vitae

Education

- **Master of Science in Biological Engineering**
  Instituto Superior Técnico, Lisbon, Portugal
  September 2021 - June 2024

- **Erasmus Mobility Programme**
  Katholieke Universiteit Leuven, Leuven, Belgium
  February 2022 – July 2022

- **Bachelor of Science in Biological Engineering**

Instituto Superior Técnico, Lisbon, Portugal
September 2018 - July 2021

Research Experience

- **Master's Thesis Internship**
  Institute of Systems and Computer Engineering - Research and Development (INESC-ID), Lisbon, Portugal
  January 2023 - May 2024

- **Research fellowship**
  ITQB NOVA, Oeiras, Portugal
  December 2024 – March 2025

  Projects:
  - SCAR: Interactions of xenobiotics with intestinal microbiota (ITQB NOVA)
  - In silico establishment of region-specific gut microbial defined communities

- **Scientific Co-worker**
  Leibniz Institute for Natural Product Research and Infection Biology (Leibniz HKI), Jena, Germany
  April 2025 – February 2026

  Projects:
  - In silico establishment of region-specific gut microbial defined communities (cont.)

Publications

Non-peer-reviewed articles, conference abstracts, theses

Master's Thesis
A metagenomics pipeline for the characterization of human gut microbiome in colorectal cancer
Institute of Systems and Computer Engineering - Research and Development (INESC-ID), Lisbon, Portugal