Student Research Job – (Techno-Economic Analysis for Microbial Production of Novel Foods)

A revolution is brewing in the global food system as ecofriendly, healthy, and economical **alternative proteins** are becoming mainstream. Alternative proteins come in three forms: plant-based, cultured meats, and microbial protein. Of these three, **microbial protein** (also known as Single Cell Protein) has an unmatched **sustainability profile** because it uses far less land, water, and fertilizer than even the best plant-based alternatives. **Connectomix** is now analyzing the possibility space for the large-scale manufacture of microbial proteins destined for **human food markets**.

Manufacturing microbial protein can be accomplished by many roads. Identifying the most promising itineraries before committing to a specific strategy is vital to avoid sub-optimal technology lock-ins. Indeed, the principles of rational design are as relevant in manufacturing as they are in metabolic engineering. By joining us for this internship, you will help illuminate how different combinations of feedstock, organism, process, and location drive **key performance indicators** (KPI). KPI of interest include, energy use, water use, cost of production, internal rate of return, CO_2 emissions, land use, waste production, employment generated, and more. These analyses will be paired with Life Cycle Assessment tools. The results will impact the choices made by large food manufacturers who are entering the microbial protein space.

Such analysis are highly multidisciplinary, and we welcome applicants with diverse skills in (but not limited to) either molecular biology, biotechnology, mathematics, programming, physics, or economics. What you need to succeed in this effort is interest in the topic of sustainability, strong research skills, motivation, and perseverance.

Logistics: **Start dates:** Multiple positions for this role starting in Aug/Sep/Oct 2022. Duration: 4 to 6 months. **Location:** Internship will be remote and involves literature research and "dry-lab" analysis. Students must be available for weekly meetings with their team via video conference.

Project description: Microbes need resources to grow. Even though sugars are a convenient feedstock for microorganisms, these are still linked to the problems of agricultural land use (hence drivers of deforestation). A more sustainable strategy can be to use renewable energy and sequestered carbon as raw materials to make C1 feedstocks, such as methanol. Yet another strategy is to use renewable power to make hydrogen gas as a feedstock. Each strategy has its merits and drawbacks. Students will chose one combination of microorganism and corresponding feedstock and assess a specific KPI, such as carbon emissions for this strategy. Some example combinations: *P. pastoris* on sugar, *P. pastoris* on methanol, *M. capsulatus* on methanol, *M. methylotrophus* on methanol, *C. necator* on hydrogen, *C. jadinii* on sugar, or *S. Cerevisiae* on sugar.

Key responsibilities

- Research about organisms and biotech processes
- Combine multiple data to calculate KPI of MP production
- Cross-check results with litterature
- Identify optimal manufacturing options

Education and experience of the student

- The role is open to multiple backgrounds
- Interest in sustainability and foods a plus
- Good quantitative skills
- Some knowledge about alternative proteins
- Must have experience using Excel
- The work will be based in English

The internship company: We are promoting sustainable production and sustainable business models by helping companies leverage microbial platforms and clean energy.

How to apply: Please fill in the application form linked below. You will be asked to submit your CV, a short cover letter and answers to a few questions. Your letter should highlight why you are interested in this topic and how your experience will help you approach the project. You can address your cover letter to Milena Ivanisevic (co-founder).

>>**Application form link**<<