

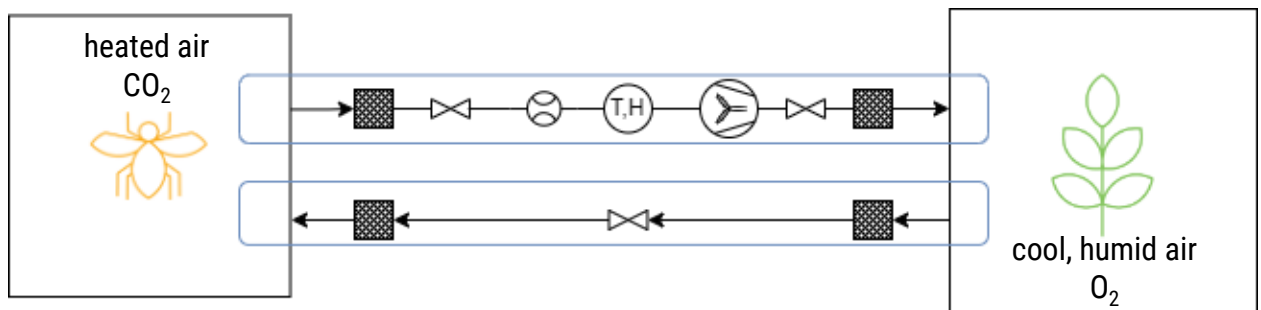
## Master Thesis

### Design of a Controllable Connectivity Module for Air Exchange between Growth Boxes

Controlled-environment agriculture (CEA) can significantly contribute to a more sustainable and resilient food production by optimizing growing conditions and controlling energy and mass flows, while also reducing the need for pesticides. Different species, such as plants or insects, require distinctly different conditions for optimal growth. As a result, CEA modules usually only involve one species and byproducts like heat or gases remain unused. Therefore, untouched potential lies in the combination of different production systems in a controllable manner. By controlling the exchange of air between such systems,  $\text{CO}_2/\text{O}_2$  as well as heat could be used more efficiently. To perform necessary experiments and to test advanced control strategies on a laboratory scale, a connectivity module needs to be developed which enables an interconnected system of growth boxes. The outcome of this thesis will facilitate further important research in the field and will have a real scientific impact.

#### Task description

- Research and choice of components (fans, filters, sensors, valves, pipes etc.)
- Conceptualization of mechanical design
- Development of embedded hard- and software
- Assembly and testing of functionality
- Characterization of system behavior for modeling and simulation purposes



**Requirements:** Background in Embedded Systems, Mechanical Engineering, Mechatronics or hands-on experience

**Start:** as soon as possible

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**What to expect:** During your research you can expect close guidance, while also maintaining freedom in how you approach the tasks. Through intermediate presentations you can prepare for your final defense and gather feedback from multiple team members throughout your project. The thesis can be written and supervised both in English or German, if your study regulations allow.