2023 Project Opportunities

Placements:
- Pheronym, Inc.
- The Better Meat Co.
- Verdant Robotics
- Nunhems
- Farm-ng
- Novozymes
Project Description:
Farmers can lose the majority of their crops without pest control. At the same time, there are concerns with the toxicity and environmental impact of traditional chemical controls. These concerns have led to regulation and outright bans on specific pesticides around the globe. Farmers and society demand climate- and eco-friendly alternatives to control pests.

Our company, Pheronym, turned to nature to win the battle against pests. We chose pheromones, communication signals, to protect our crops. Pheronym uses nematode pheromones to control agricultural pests, providing climate-friendly alternatives to soil fumigants and improving soil health. In other words, Pheronym enables farmers to control pests in the soil using climate- and eco-friendly solutions.

Pheronym has demonstrated the feasibility of manufacturing nematode pheromones with in-vitro fermentation methods. The selected fellow will begin by conducting existing in-vivo and in-vitro experiments to develop the knowledge, techniques, and skills to succeed. The fellow will be guided and supervised until the necessary competencies are met. Once met, the fellow will assist in the transition from shaker flasks to bioreactors including media optimization, ratios, and oxygen levels for in-vitro nematode growth. The selected fellow will also assist in the down-stream processing and testing of produced nematode pheromones. There will also be opportunities to learn and work on other nematode/pheromone related projects with other full-time employees that may extend beyond the scope of in-vitro fermentation.

Minimum requirements:
- Degree focus in biology, biochemistry, microbiology, or related fields.
- Completion of general chemistry and biology laboratory courses.
- General experience operating pipettes, microscopes, and centrifuges.
- Must be comfortable working with live/dead insect larvae, nematodes, and bacteria cultures.
- Must be comfortable working at a microscope for extended periods of time.

Preferred qualifications:
- Excellent general mathematical ability and knowledge in computing rate, ratio, and percent.

What skill development/experiences will this placement offer?
Students will gain experience in:
- Nematode infection process using beneficial nematodes and a model insect Galleria mellonella.
- In-vivo nematode production and quantification.
- Manage and maintain media(s), nematode and bacteria cultures, as well as extracted pheromone samples.
- Sterile techniques such as preparing agar plates etc. and operating standard laboratory equipment such as autoclaves and laminar flow hoods.
- In-vitro nematode fermentation in shaker flasks for pheromone production.
- Critical thinking, data collection, recordation, and verification.
- Prepare, organize, and maintain a laboratory notebook.
- Participate in weekly laboratory meetings
Company name: Verdant Robotics
Project location: Virtual (working remotely), optionally hybrid or in-person in Hayward, CA

Project Description:
As an agricultural startup, we have a number of interesting technical projects to explore. Some of these projects include:
- Dataset visualization (Statistics, Distributions, Metadata, etc.) for our large-scale datasets
- Development of a Web app to visualize geolocated soil types on a Map
- Setup of an inference infrastructure for our models for internal usage and easy access
- Comparison of different object detection architectures and Frameworks: One Stage, Two Stage (e.g. DetectronV2, MMDetection,...), Transformers (Swin, DETR, ...)
- Comparison of different segmentation model architectures using publicly available datasets
- Setup of a training orchestration pipeline using Kubeflow or similar Toolkits
- Create an error category framework for object detection errors to better understand model performance.

Ultimately the project will be selected based on the interest and the skill set of the student.

Minimum requirements:
- Organizational skills
- A background in computer science, data science or similar field
- Basic knowledge about algorithms and data structures, Python, and Linux
- Interest in software development

Preferred qualifications:
- Git
- Web development
- REST APIs
- NoSQL databases
- Docker
- Pytorch

What skill development/experiences will this placement offer?
- Code documentation
- Test Driven Development with Python and Pytest
- Work with issue tracking management tools
- Software version control in a team of developers
- Software development under Linux
- Software deployment using containers
- Research in Industry setting
Company name: The Better Meat Co.
Project location: West Sacramento, CA (In Person)

Project Description:
Assist with the design and planning of specific equipment and processes related to the fermentation operations.

Minimum requirements:
Studying chemistry, food science, engineering, or biology

Preferred qualifications: none

What skill development/experiences will this placement offer?
- Hands on mechanical work
- Laboratory work
- Aseptic practices
Company name: Nunhems
Project location: Hybrid (office in Davis, CA; field location in Acampo, CA)

Project Description:
We are developing computer algorithms to automate some of our breeder's phenotyping workflow. The selected individual will be part of the team to collect and analyze the data. The selected fellow will be able to participate in the full workflow of algorithm development, depending on the progress and their expertise level.

Minimum requirements:
Basic computer skills are required for working with spreadsheets.
Curious and motivated to learn about agriculture.

Preferred qualifications:
Familiarity with Linux/Command line environment and programming skills are preferred

What skill development/experiences will this placement offer?
programming, hands-on experience working with the breeding team
Project Description: The project is to configure and program a general-purpose farm robot, the Amiga, for use in the field of agriculture. Demonstrate and test with actual and potential users. Define opportunities for improvement and aid engineers in the development of refined tooling/capabilities.

Minimum requirements:
The intern should be familiar or have experience in one of the following subject matter areas: (1) mechanical engineering, (2) electronics, or (3) computer programming (Linux, Python). (4) Farming and Agriculture. No formal training is required. Self-taught hackers are more than welcome to apply.

Preferred qualifications:
Someone who is passionate about mechanics, electronics, or programming, has problem-solving skills, and can work as part of a multidisciplinary team.

What skill development/experiences will this placement offer?
The student will gain hands-on experience into the future of farming, learning how robots can be used as practical tools in the field.
Project Description:
Fermentation-based production of specific, functional ingredients offers possibilities for improving the health properties, sustainability, nutrition, and taste of foods. At Novozymes, we are pursuing multiple approaches to provide better nutrition and health through sustainable and scalable precision fermentation.

Minimum requirements:
The candidate should be currently studying Biochemistry, Chemistry, Biotechnology, Microbiology, or a similar discipline, with successful completion of coursework in general biology and chemistry.

Preferred qualifications:
Preferably successful completion of biochemistry coursework with associated laboratory sections, and an understanding of basic concepts in protein structure and function.