

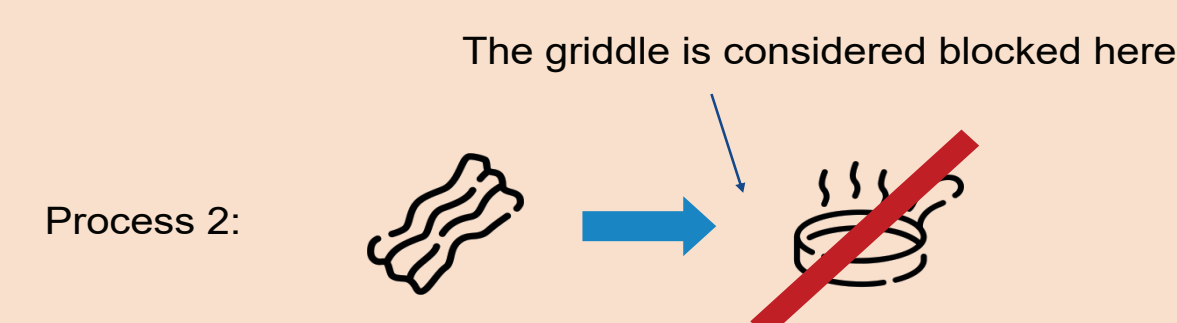
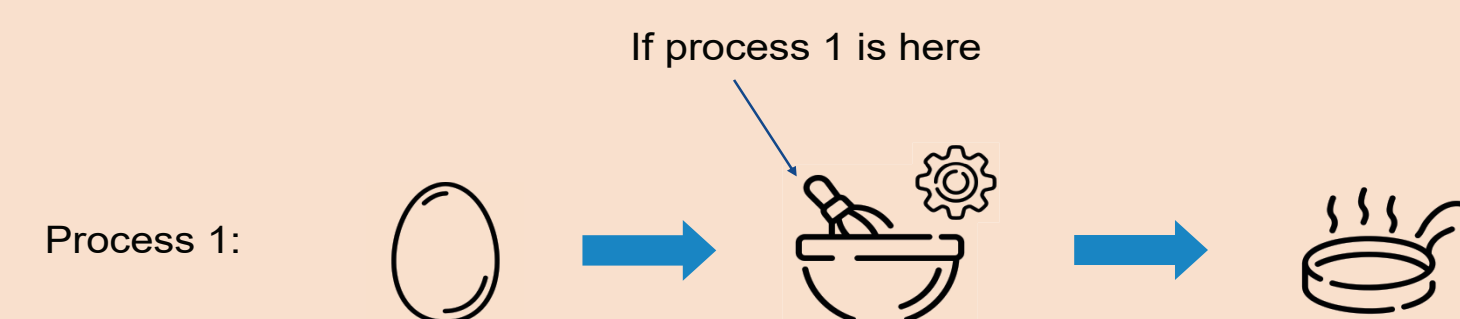
# vestra: An Open-Source Biotech Robot Orchestrator

## The Problem

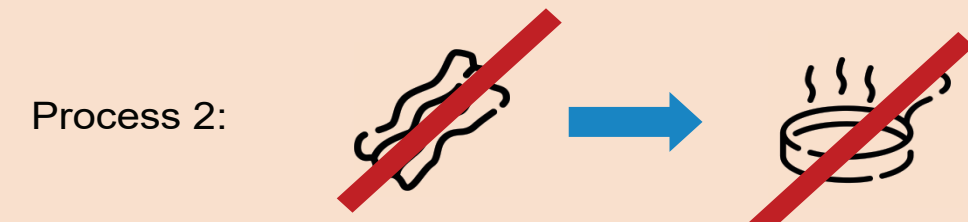
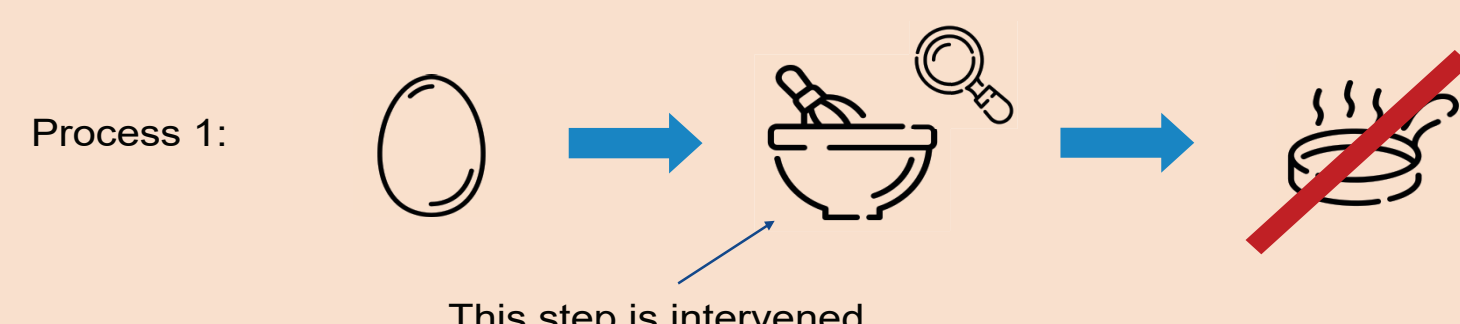
Moderna utilizes automated Biotech labs to rapidly develop new formulations. These labs are used by dozens of scientists every day and interface with even more devices. Tools, such as instruments and robots, are operated by a orchestration and scheduling software. The existing system significantly hinders efficiency, reliability and speed which is especially integral to biotech research.

## Pain Points

Labs cannot run tools or processes in parallel



If one machine is intervened all go down



To create one process, a user must navigate:

- Two definitions
- Three graphical user interfaces
- Split functionality
- Obtuse logging

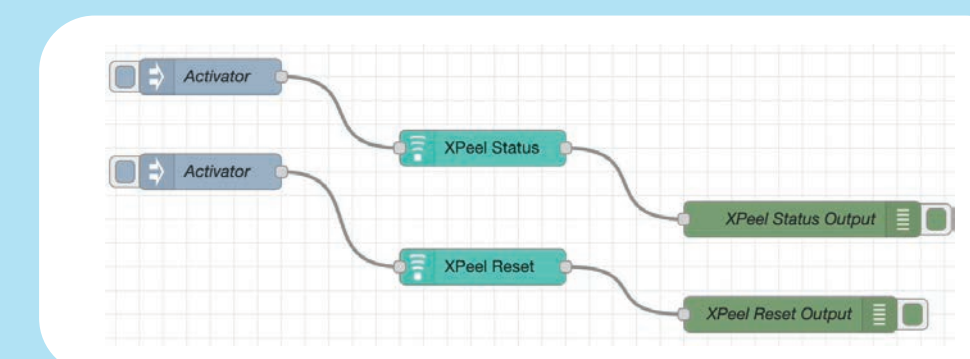
## Our Solution

We created Vestra, an easy-to-use and Open-Source Biomedical Robot Orchestrator. Vestra simplifies the lab automation process, improving efficiency, efficacy, and quality of life for all users.

## Features

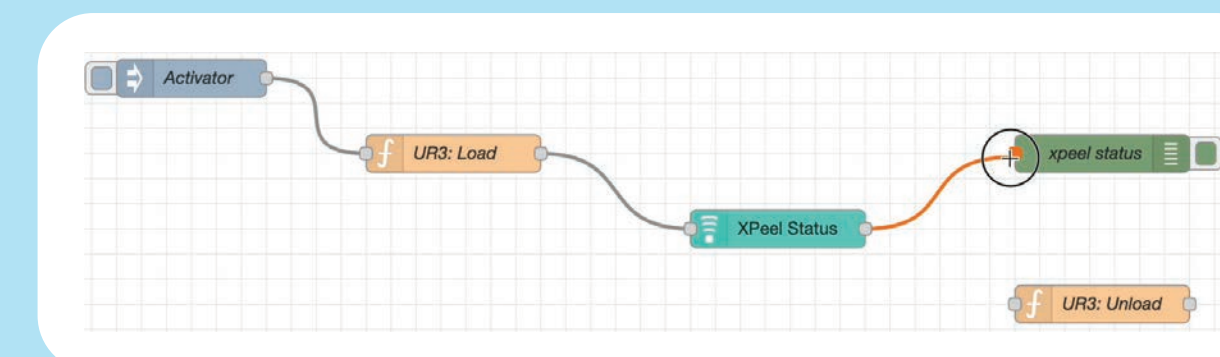
### Parallel Workflows

Vestra reduces instrument downtime and improves lab efficiency by allowing processes to run in parallel even if they include the same device. This speeds up experiments considerably and makes it easier to develop formulations.



### Drag Drop and Connect!

Vestra is made to be as easy as possible to pick up and use. Every device function, like moving an arm or spinning a centrifuge, corresponds to one block. Just connect them together and press a button then the Orchestrator will do the rest.



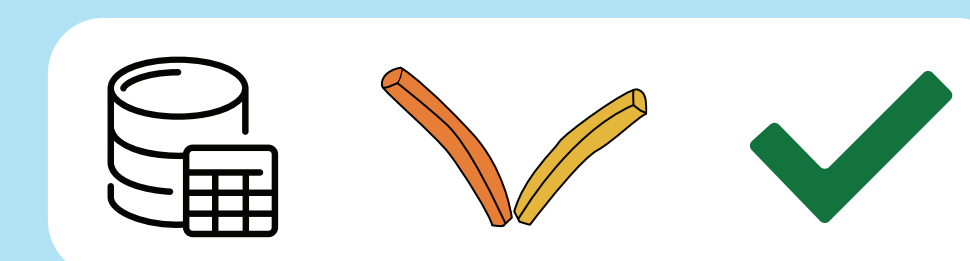
### Adaptable Design

Vestra is designed for adaptable and ease of use for all users. To maximize the utility of the system we created an easy to configure Inter Process Communication interface so you can talk to devices in any programming language.



### Robust Response to Failure

Vestra stores processes in our backend relational database so in the event of unexpected failure or e-stop, the flow can resume where it was interrupted. Features like this are shockingly rare across the industry.



## Open Source

Vestra is tackling the big issues within lab automation software. Our mission is to deliver the greatest possible impact to researchers through our software solution. We've developed an open-source solution to these issues to push the industry to innovate and improve the efficiency of automated biotech laboratories. By making our software open source, we make our software both easier to use and easier to configure, allowing developers to add their own value through our software.

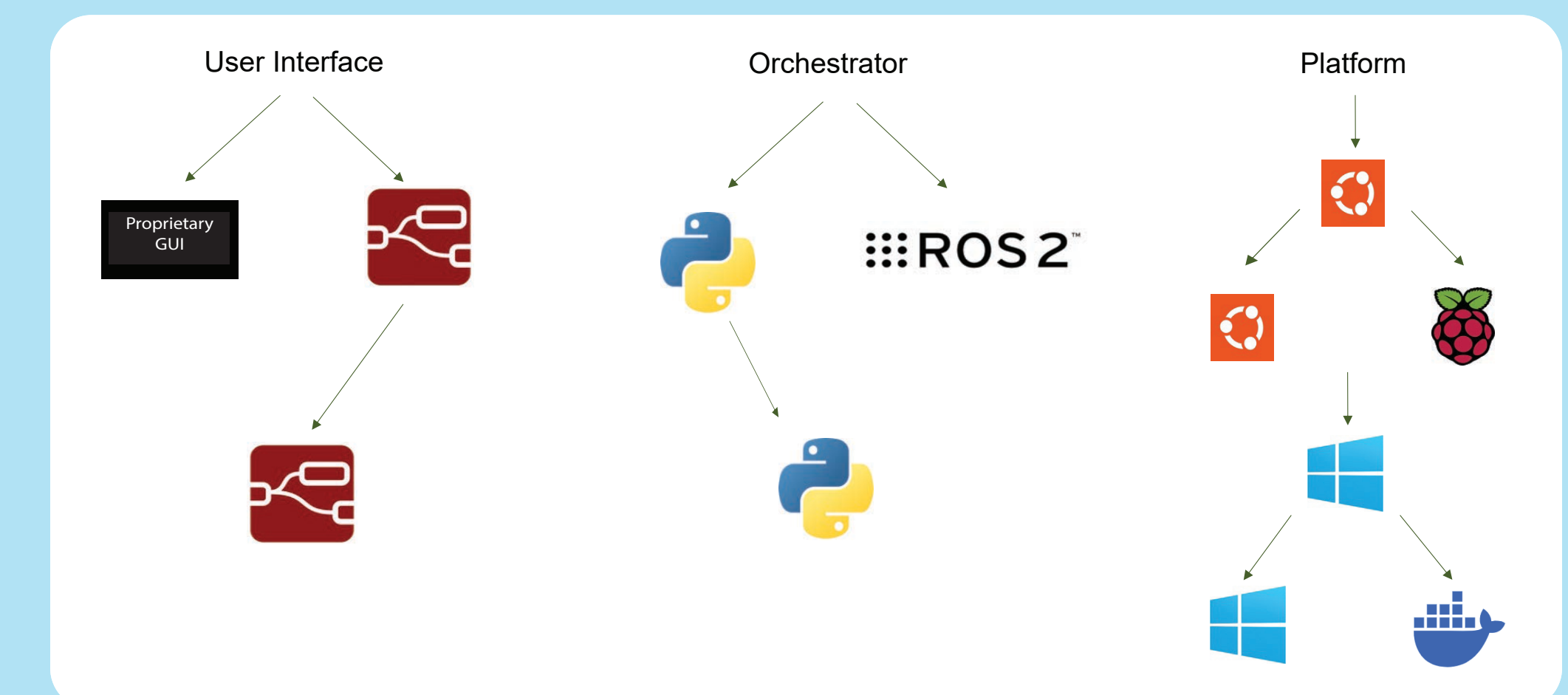
## Pushing The Industry

Lab orchestration is stuck in the past across the industry. Interviewing scientists, engineers, and automators led us to find archaic software faults entrenched in these systems. We knew we could improve things.

We found that many of our challenges when dealing with biotech devices came from how obtuse and rigid they were to operate. This insight led us to design our architecture to be as adaptable as possible and helped inspire our choice to make the software open source.

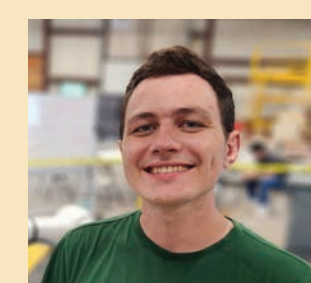
## Technical Implementation

We utilized multiple different open source softwares to create a reliable and easily maintainable software. We iterated on our design until we found the most effective, easy to use, and robust solutions.

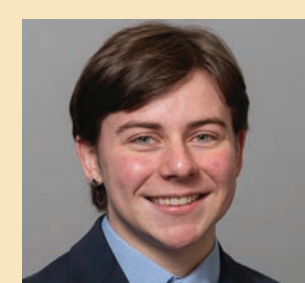


## Next Steps

We designed this system for Moderna but you can also start using and contributing to Vestra today. Just go to [github.com/SCOPE-Moderna/biomedical-robot-orchestrator](https://github.com/SCOPE-Moderna/biomedical-robot-orchestrator) and start contributing.



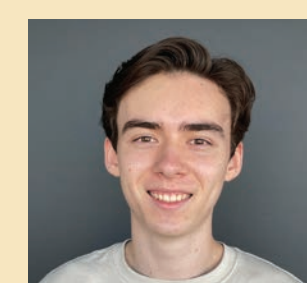
Luke Witten



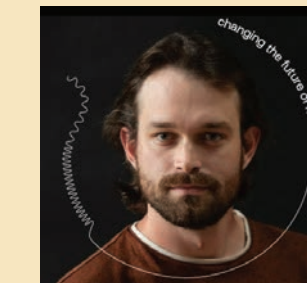
AJ Evans



Sam Mendelson



Kenta Burpee



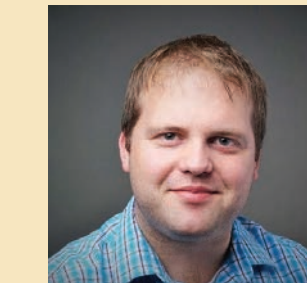
Ted Liska



Nick Lapin



Xavier Sanchez-Felix



Andrew Coats

