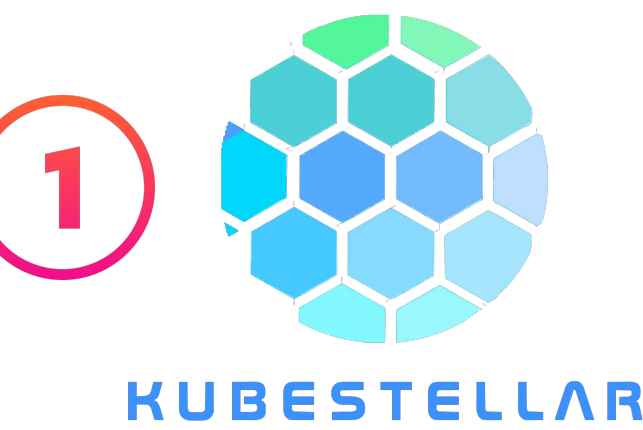


## MOTIVATION

The UN projects global population to reach 10 billion in 25 years. How do we protect farmers, and the environment, while scaling to feed these 10 billion people by 2050?

## APPROACH

We use KubeStellar and Confidential Containers to build a framework to protect farmers, their data, and the environment.



KubeStellar allows for multi-cluster orchestration with offline support.



Confidential Containers run unmodified applications in a Trusted Execution Environment (TEE) on the cloud.

## INTEGRATING KUBESELLAR AND CONFIDENTIAL CONTAINERS

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: edge-deployment-v0
  labels: {app: "ipp-edge"}
  namespace: edge-ns
spec:
  selector: { matchLabels: {app:
ipp-edge} }
  template:
    metadata:
      labels: {app: ipp-edge}
    spec:
      containers:
        - name: edge-v0
          image: hsi-detection:latest
          ports:
            - containerPort: 3000
            imagePullPolicy: Always
            runtimeClassName: kata-remote
```

# Private Computation Spaces via Confidential Containers and KubeStellar

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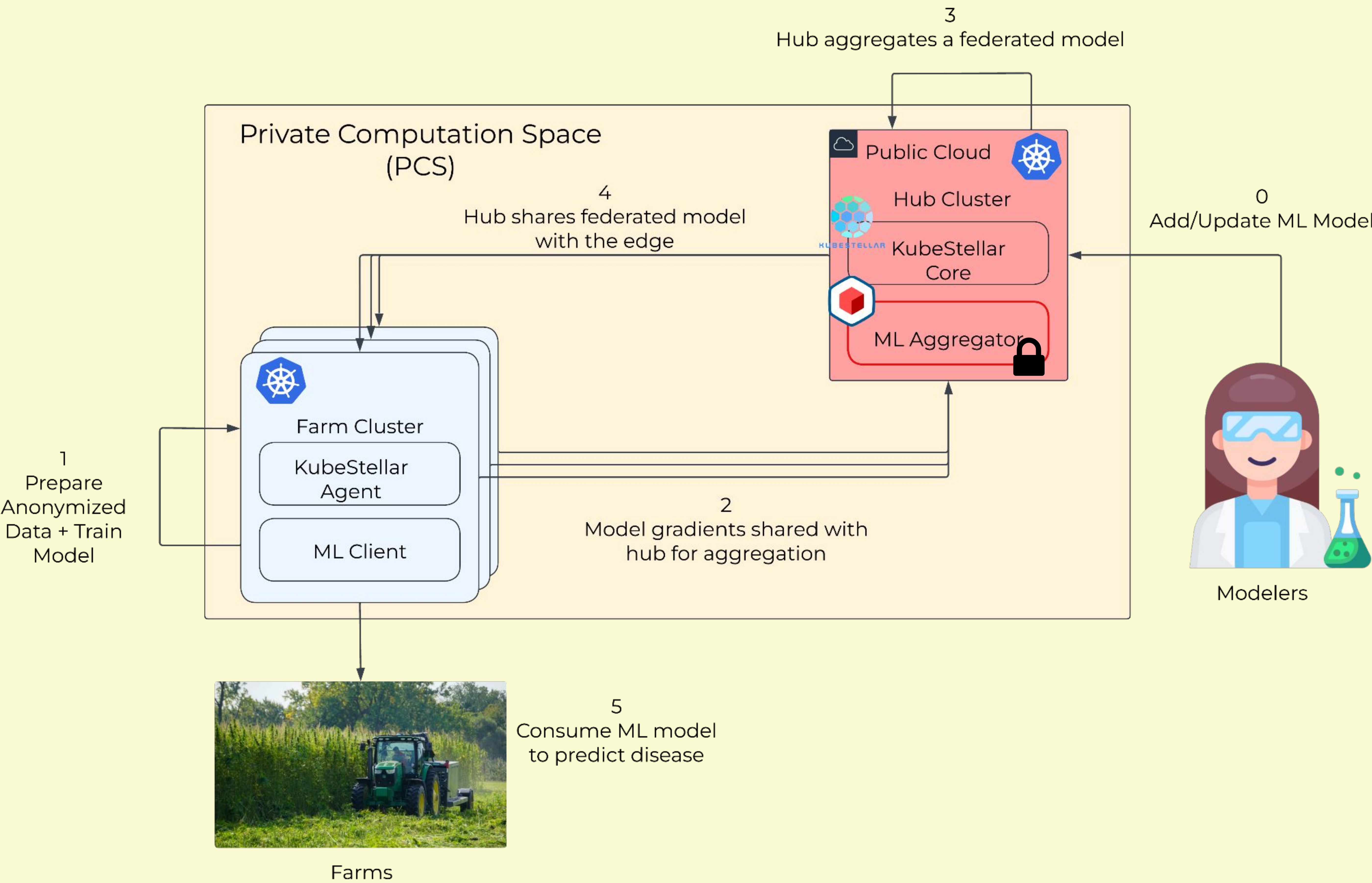
In collaboration with:

**IBM:** Andy Anderson, Braulio Dumba

**NSF CROPPS:** Israel Gabay, Vesna Bacheva, Muzhi Jiang, Abraham Stroock, Elizabeth Jones

**Cornell:** Katie Gold, Shivranjani Baruah, Manushi Trivedi

**NASA ACRES:** Alyssa Whitecraft, Ritvik Sahajpal

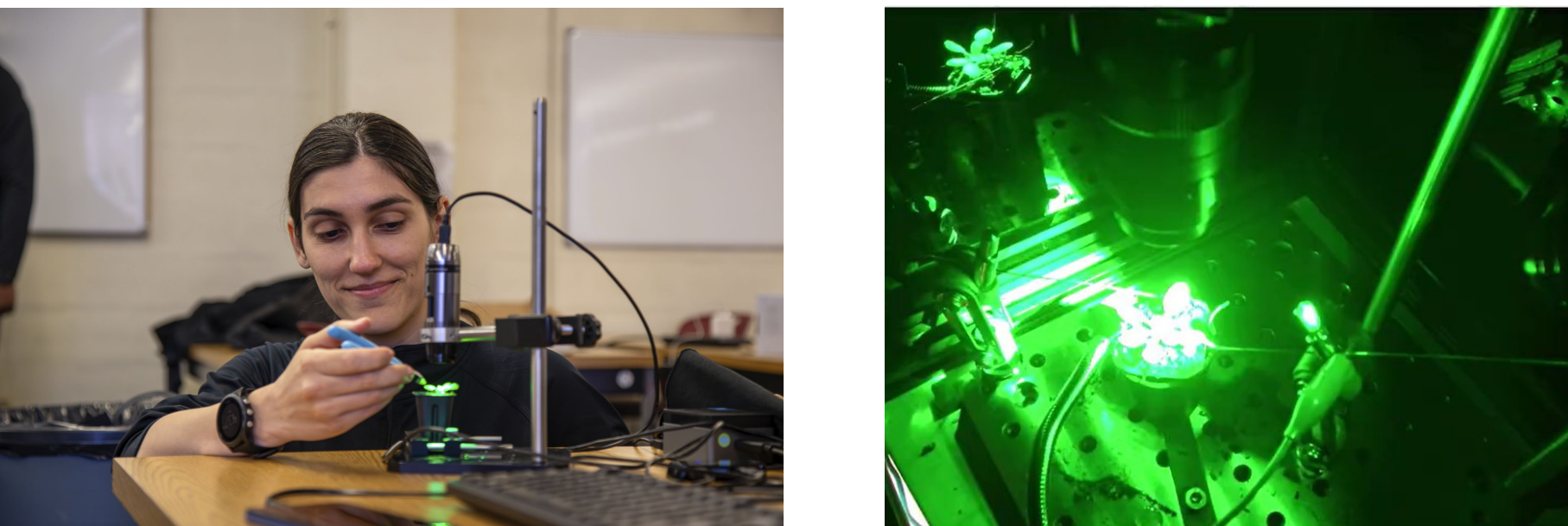


## DEPLOYED USE CASES

We have 3 deployed exemplar workloads that show how the PCS can be used on the field:

### 1. CROPPS-in-a-Box

Discovering the hidden language of plants



### 2. Vineyard Disease Detection using Hyperspectral Imaging (HSI)

Collaboration with NASA for early disease detection using AVIRIS-NG and AVIRIS3 datasets



### 3. Predicting Maize Yield in Ukraine with NASA Earth Observation data

Time-series data from 2001 - 2024 spanning 19 regions in Ukraine



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