

ARTIFICIAL

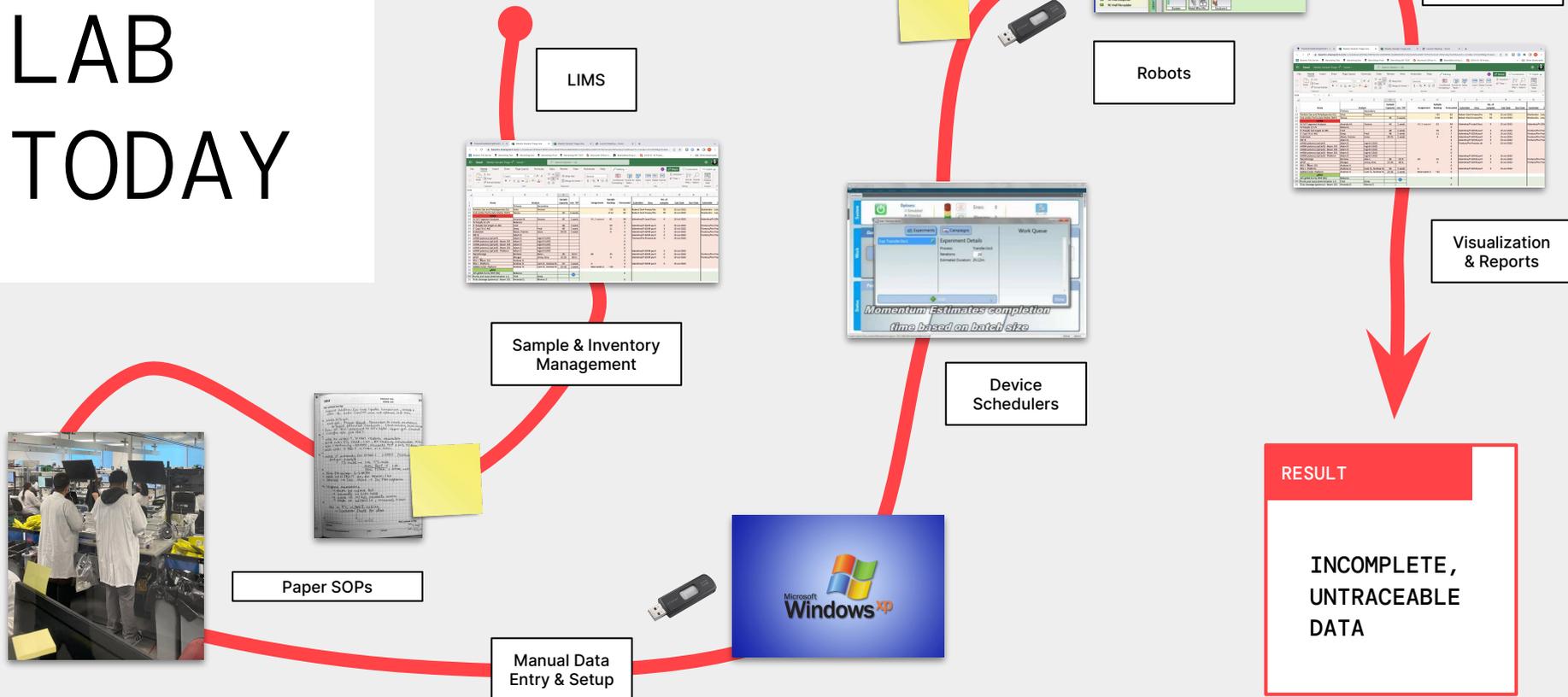


The Digital Platform for the Modern Lab

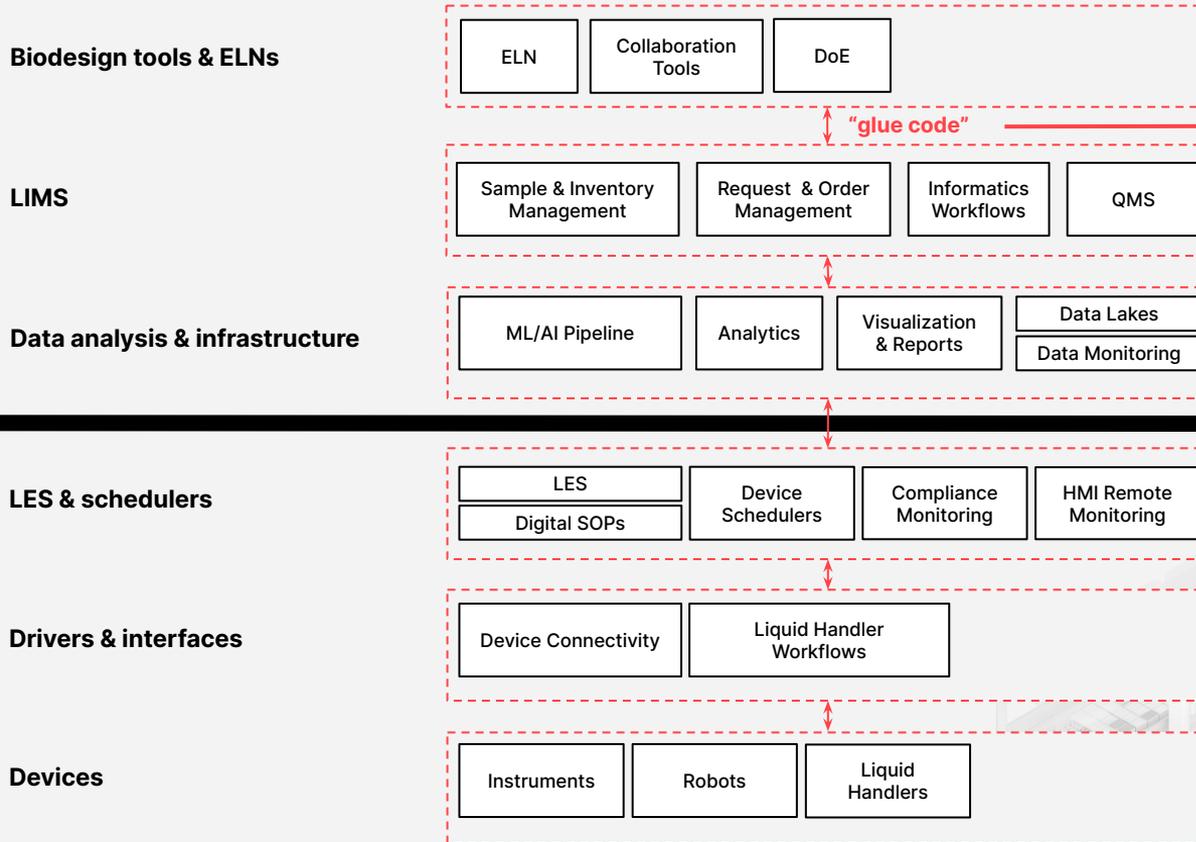


THE LAB TODAY

🕒 Scientist wants to run an experiment



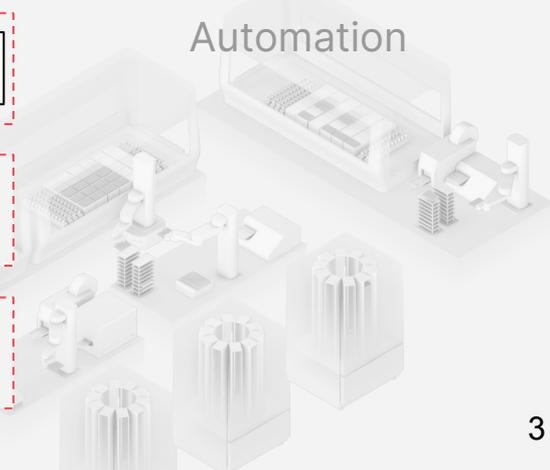
BUILDING THE LAB STACK TODAY IS MANUAL, MESSY, AND UNSCALABLE



Highly manual, **one-off** and **unscalable** code written by a human, increasing chances for **errors** across multiple steps in every process

Informatics

Automation



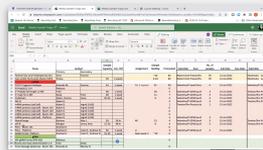
THE AVERAGE BIOTECH LAB LOSES OVER **\$750K EVERY YEAR** TO PREVENTABLE INEFFICIENCIES

	\$ lost per year	Time lost per year
→ Manual data entry, tracking, and cleanup	\$237k	2160 hours
→ Lack of automation engineer tools to scale experiments	\$450k	3120 hours
→ New lab tech turnover & training	\$27k	480 hours
→ Redoing experiments due to human error	\$62k	200 hours
Time & money lost every year	\$776K	5960 hours

Artificial is the **only company** providing a **vertically integrated orchestration platform** that can operate across both digital and physical worlds.

🧪 **Scientist** wants to run an experiment

Data / LIMS / ELN



AI



**CLOUD
PLATFORM**

RESULT

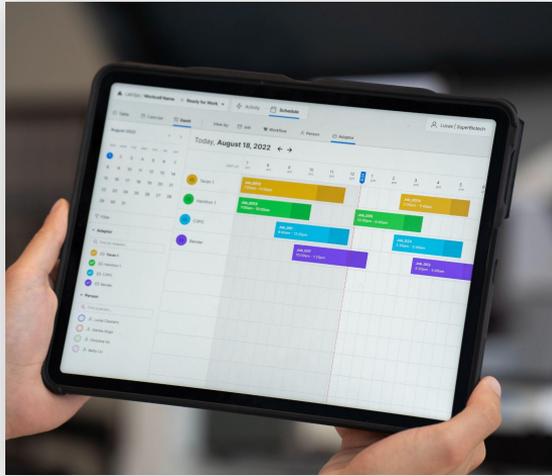
People



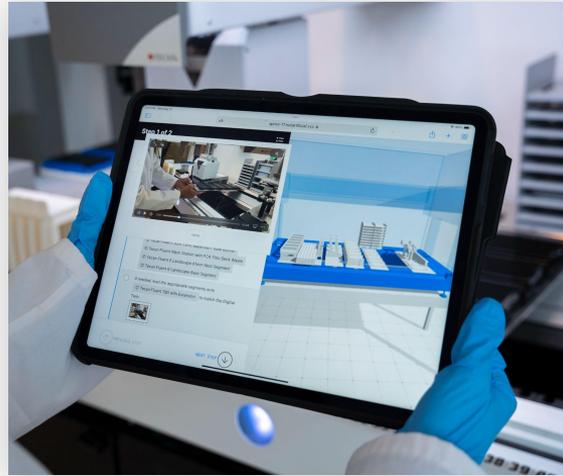
Lab Instruments



FROM REQUEST → RESULT IN ONE SINGLE PLATFORM



1. →
Scientist creates & schedules a new experimental request



2. →
Artificial guides operators and scientists through manual steps



3. →
Artificial runs and consolidates results in the cloud

THE LAB STACK WITH ARTIFICIAL

Biodesign tools & ELNs



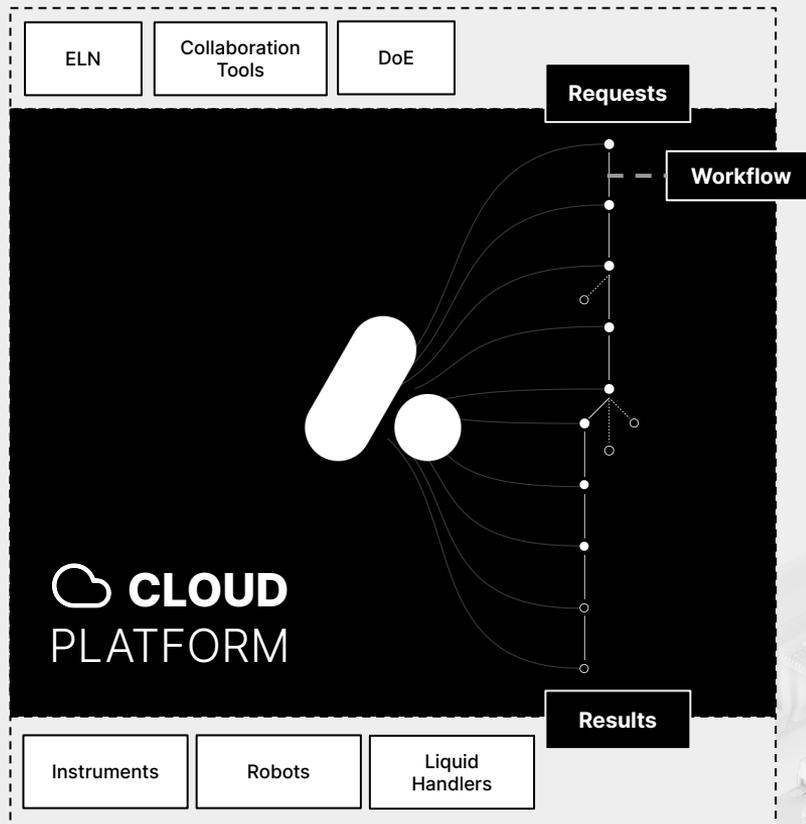
LIMS

Data analysis & infrastructure

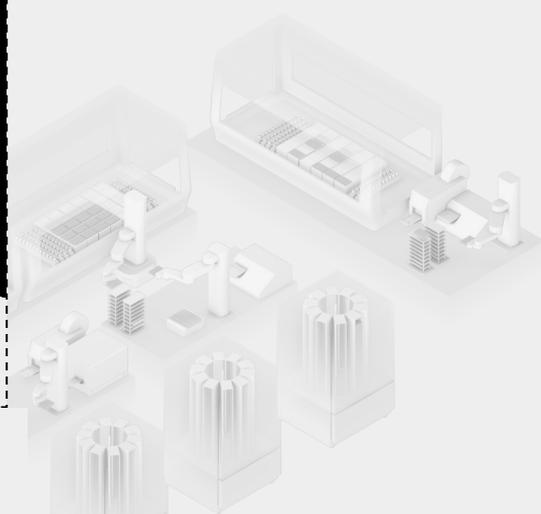
LES & schedulers

Drivers & interfaces

Devices

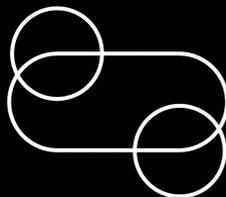


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The Artificial Platform



Artificial LabOps

Run & orchestrate your lab

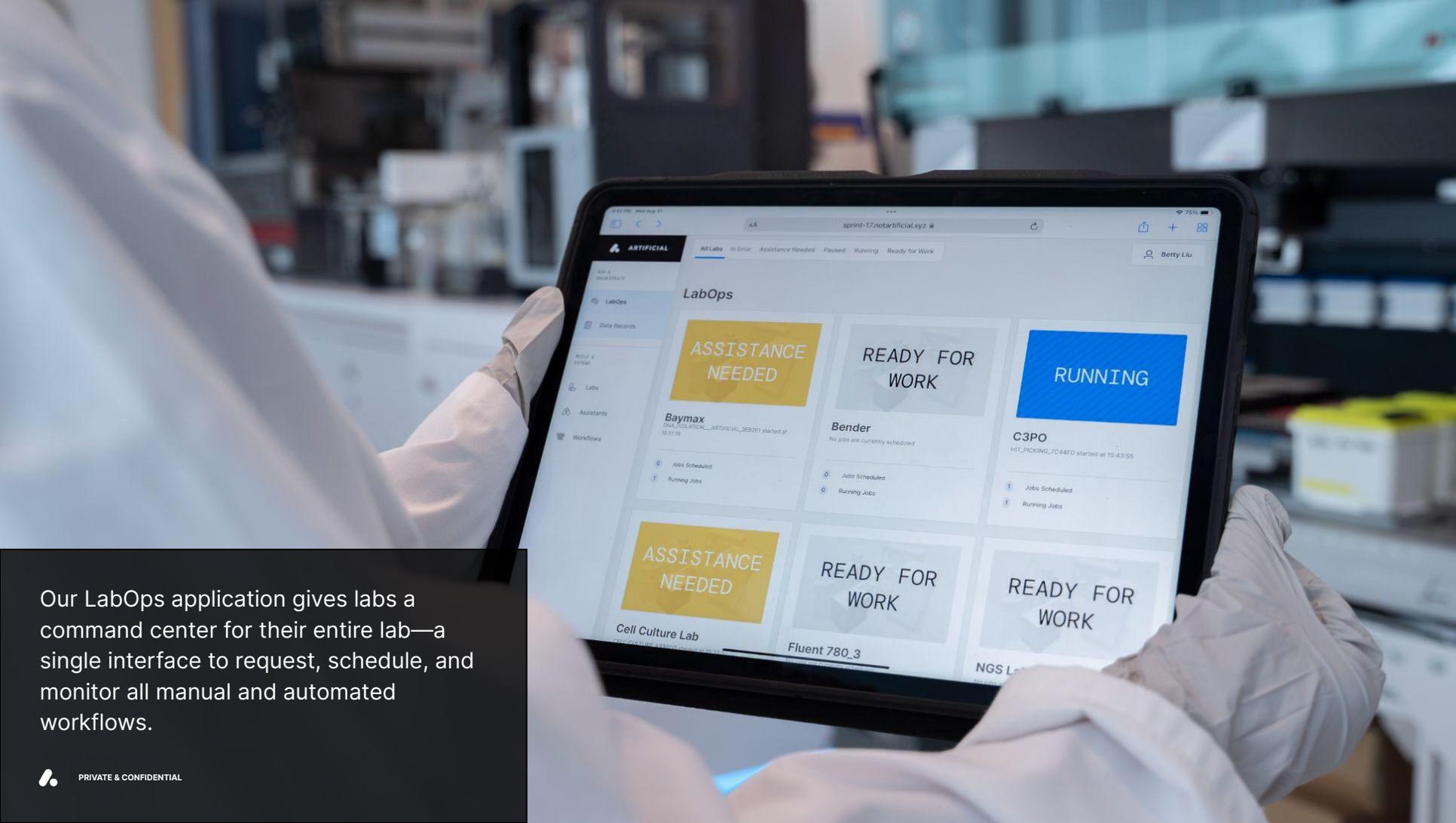
A command center for your entire lab—a single interface to request, schedule, and monitor your manual and automated workflows.



Artificial Digital Lab Toolbox

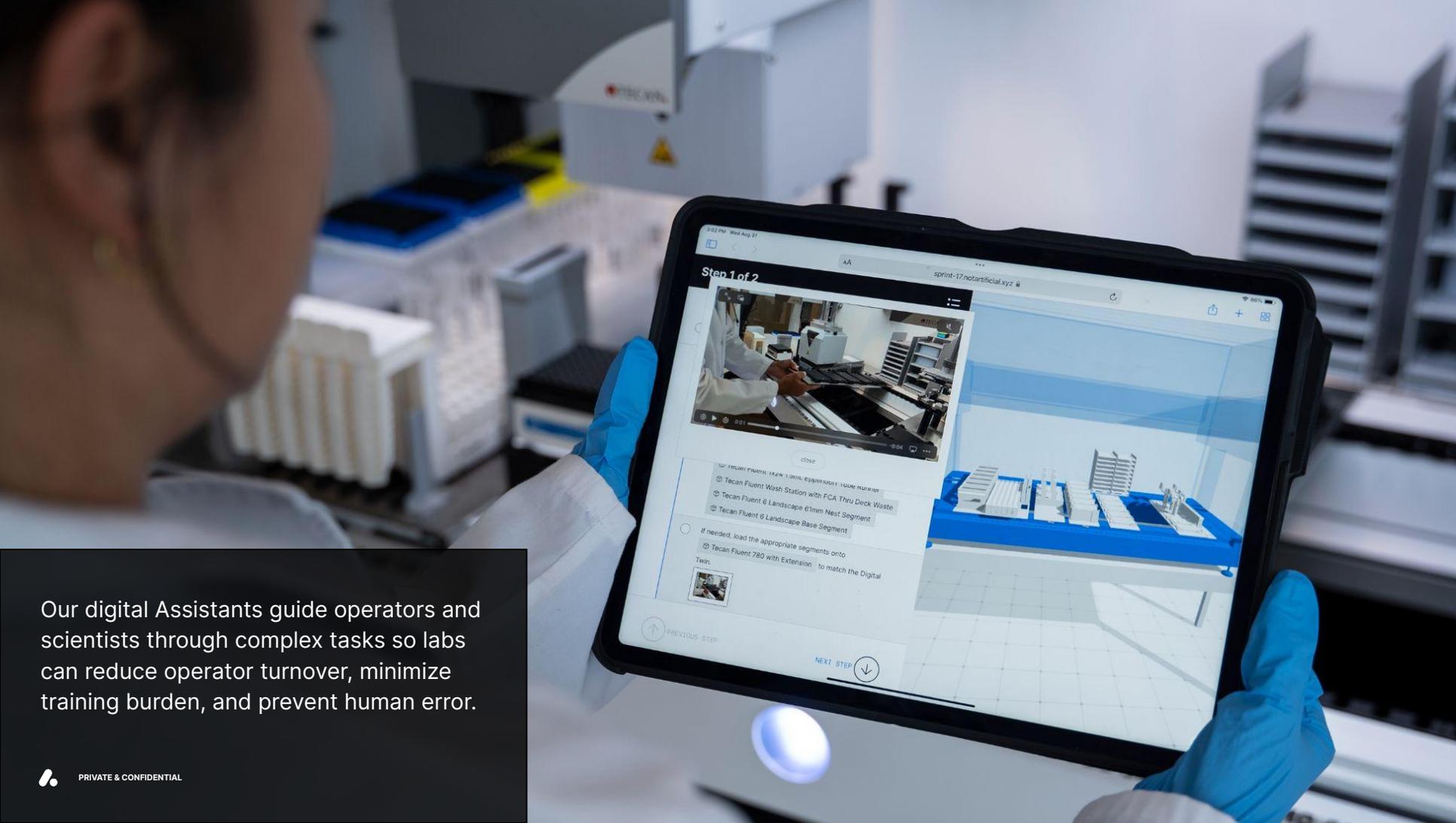
Digitize your lab, SOPs and workflows

No-code, low-code tools for automation engineers and scientists to customize the Artificial platform for their specific lab context.



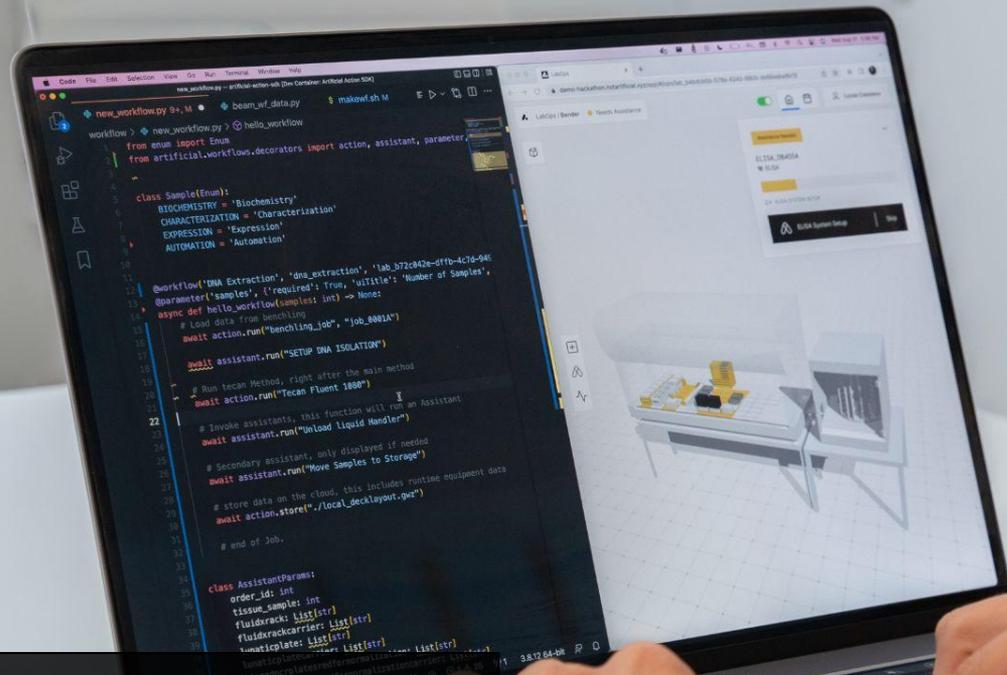
Our LabOps application gives labs a command center for their entire lab—a single interface to request, schedule, and monitor all manual and automated workflows.





Our digital Assistants guide operators and scientists through complex tasks so labs can reduce operator turnover, minimize training burden, and prevent human error.





Our no-code Editors and Orchestration Python SDK give labs the power to adapt as things change. Our Workflows capture a complete view of people, machines, & informatics and how they interact over time to get lab work done.



Complete, Contextualized Data Records

All experimental runs in Artificial produce a complete, contextualized data record in the cloud with 360° metadata context ready for AI, compliance and analytics.

Data Records / **JOB_NGS_1010** **Summary** Resources Results

JOB_NGS_1010 Started: 11/4/2021, 7:41:21 AM Warnings 1 **Completed**
NGS Completed: 11/4/2021, 7:41:21 AM Errors 1

Assistants **Activity** Requests Notes System Logs

Activity Name Completed By Start Time End Time

1.0 Setup Benchling	Artificial Adaptor	11/04/2022, 7:24:00 AM	11/04/2022, 7:24:00 AM
2.0 Setup Cellario 2 Warnings	Artificial Adaptor	11/04/2022, 7:24:00 AM	11/04/2022, 7:24:00 AM
3.0 Assistant: Load DNA Iso	Sarah Marcus	11/04/2022, 7:24:00 AM	11/04/2022, 7:24:00 AM
3.1 Load Hamilton with Tube Carriers	Sarah Marcus	11/04/2022, 9:24:00 AM	11/04/2022, 9:26:00 AM
3.2 Load Hamilton with Sample Plates	Sarah Marcus	11/04/2022, 9:27:00 AM	11/04/2022, 9:30:00 AM
3.3 Fill Reagent Troughs 2	Sarah Marcus	11/04/2022, 9:32:00 AM	11/04/2022, 9:39:00 AM
3.4 Add PK Buffer	Sarah Marcus	11/04/2022, 9:45:00 AM	11/04/2022, 9:50:00 AM
3.5 Setup MultiFlo FX	Sarah Marcus	11/04/2022, 9:52:00 AM	11/04/2022, 10:20:00 AM
3.6 Setup Kingfisher Flex	Sarah Marcus	11/04/2022, 10:24:00 AM	11/04/2022, 10:30:00 AM
3.7 Empty biohazard bin	Jon Fisher	11/04/2022, 10:22:00 AM	11/04/2022, 10:23:00 AM



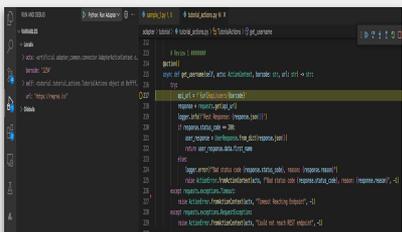
ENGAGEMENT ACROSS THE ARTIFICIAL PLATFORM

SOFTWARE ENGINEER

LAB AUTOMATION
ENGINEER/SPECIALIST

SCIENTIST

LAB MANAGER/LAB TECH
SCIENTISTS
AUTOMATION ENGINEERS



```
1 import sys
2 import os
3 import logging
4 import argparse
5 import json
6 import requests
7 import time
8 import random
9 import datetime
10 import re
11 import subprocess
12 import shutil
13 import glob
14 import tempfile
15 import hashlib
16 import base64
17 import uuid
18 import math
19 import decimal
20 import fractions
21 import itertools
22 import collections
23 import statistics
24 import functools
25 import operator
26 import multiprocessing
27 import concurrent.futures
28 import asyncio
29 import aiohttp
30 import websockets
31 import websocket
32 import pika
33 import kafka
34 import kafka.tools
35 import kafka.admin
36 import kafka.zookeeper
37 import kafka.errors
38 import kafka.protocol
39 import kafka.structs
40 import kafka.codec
41 import kafka.codec.encoder
42 import kafka.codec.decoder
43 import kafka.codec.encoder_v1
44 import kafka.codec.decoder_v1
45 import kafka.codec.encoder_v2
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100 import kafka.codec.decoder_v29
```

Python SDK

Leverage the Artificial platform to develop, test, and deploy actions to interface with instruments or other software

Expand on Artificial's library of Adapters with custom devices or functionalities



Workflows SDK

Compose workflows from existing Assistants, and premade Actions

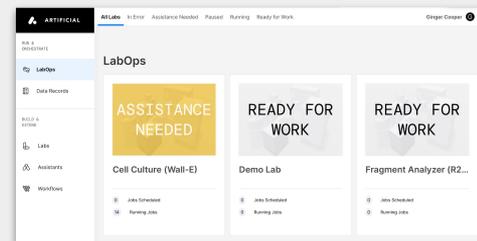
Drag and drop Assistants for manual actions, automated actions and configurations



Assistants

Define new Labs (digital twins) and Assistants (digital SOPs) for execution

Leverage existing functionality for easy drag and drop lab set up and human native text for Assistant creation



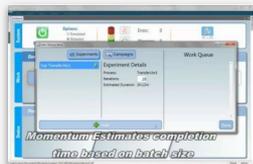
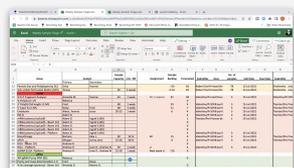
LabOps

Single platform and command center to schedule, monitor and execute work

Create requests, launch jobs and follow Assistants for visual step-by-step guides to execute end to start workflows

THE "CLOSED LOOP LAB" TODAY

Pharma Xs current lab is run completely manually. Most critically, data lives in disaggregated spreadsheets and there is no visibility into what experiments have been run in the past. This significantly slows down their R&D and their ability to get to production.



DESIGN

Scientists determine which experiment to try next.

"How do you decide what to run?" → "We have a monthly meeting and talk about it for 2 hours."

BUILD

Heterogenous, non-integrated equipment in a lab is run manually by lab techs and lab manager. No tracking of manual steps.

TEST

Equipment is disconnected. Data is gathered in an ad-hoc manner and ends up in silos, file systems or thumb drives in non-standard formats and in spreadsheets at best.

LEARN

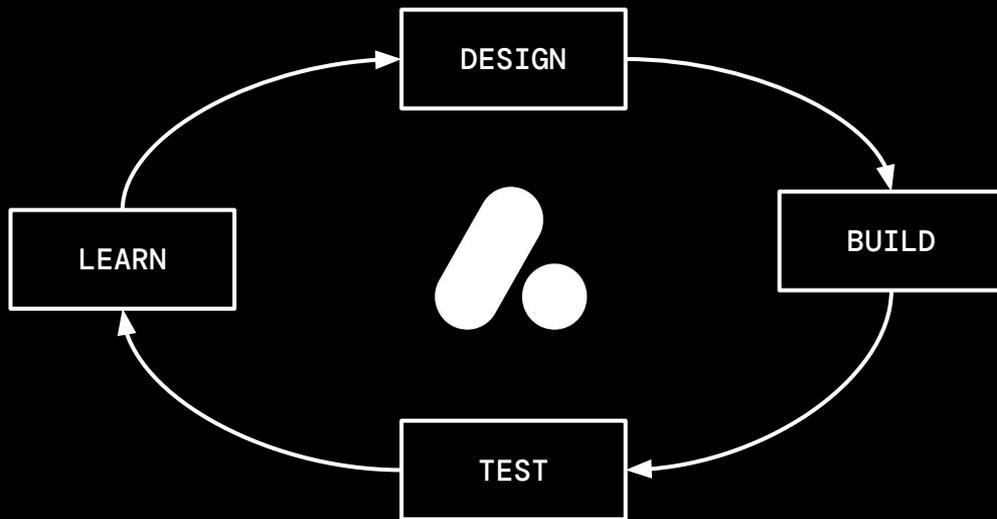
Scientists manually query data living in disaggregated spreadsheets.

"How do you query your data?" → "I walk down the hall and ask three people"

THE CLOSED LOOP LAB WITH ARTIFICIAL

Artificial acts as a central command center for Pharma Xs Lab, enabling faster time from R&D to Production.

Request & Job Module: Pharma X's AI algorithm determines next set of experiments to try combined with Scientist input (in Artificial).



Data Records: Results can be queried and viewed by Scientists in Artificial and are directly fed back into Pharma X's AI algorithm to determine next experiment.

Local Scheduler, Orchestration Engine: Artificial determines what steps need to be run and executes them on an automated system.

Local Scheduler, Orchestration Engine: Once experiments are ready, Artificial schedules instruments to analyze samples and generate data.

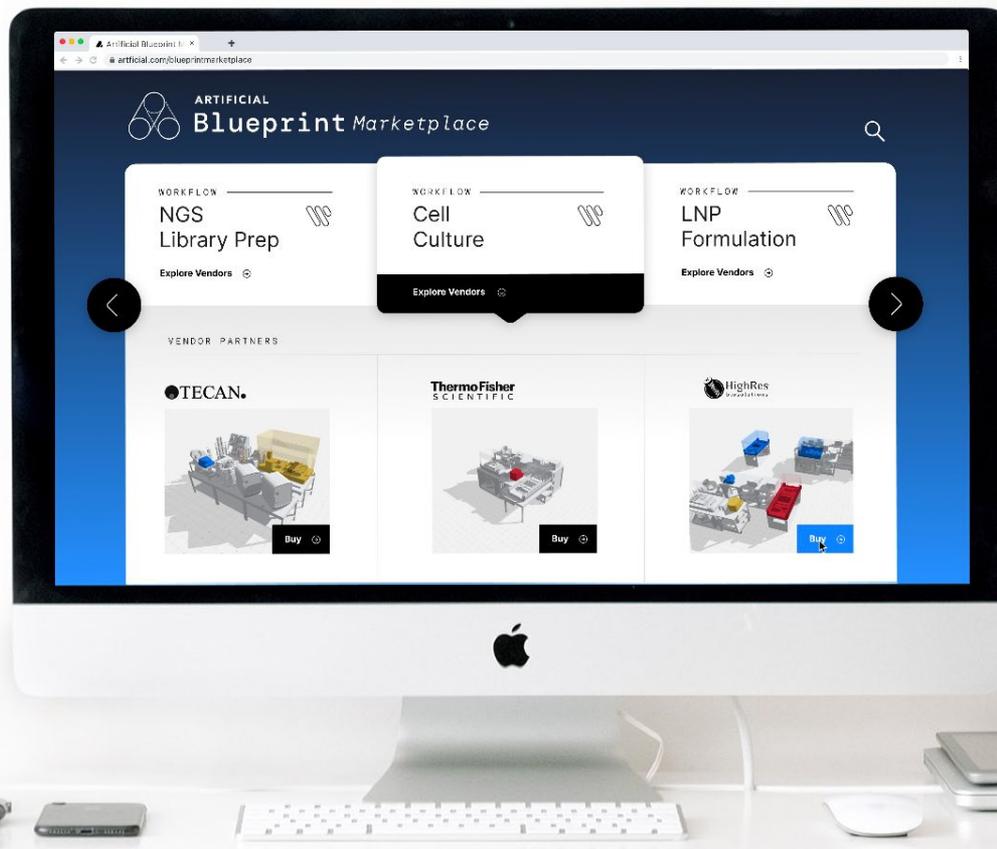


ARTIFICIAL BLUEPRINT MARKETPLACE

“The Github of Scientific Workflows”

We are building a marketplace of **common workflows supported by vendor partners** so labs can easily search, simulate, and buy end2end solutions.

Our common workflows provide **repeatability, reliability, and portability** across locations and vendors.



OUR TEAM

We know what it takes to **connect bits to atoms**, while keeping **humans-in-the-loop**.



DAVID FULLER, CO-FOUNDER & CEO

CTO of the KUKA Group

Managing Director KUKA Roboter ~\$1.6B rev.

VP of SW R&D at National Instruments



NIKHITA SINGH, CO-FOUNDER & CPO

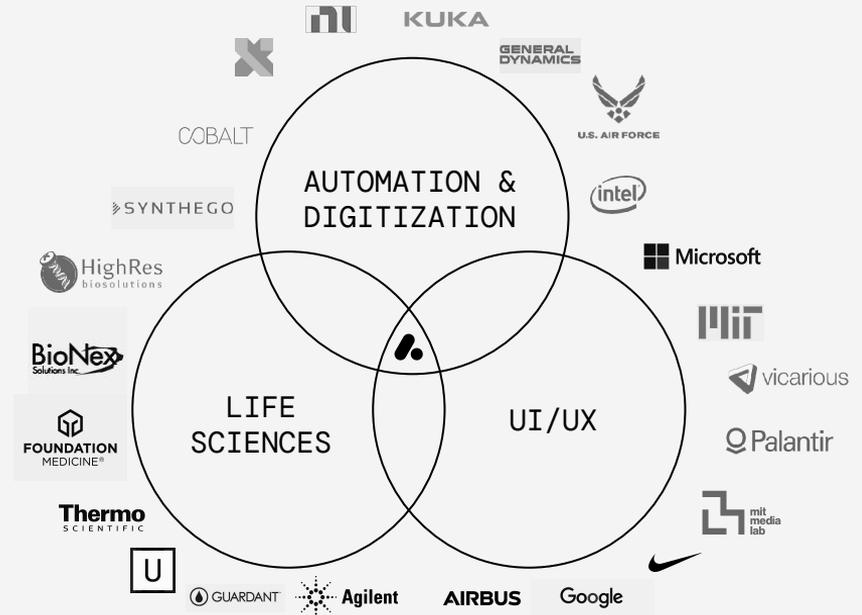
Human-Robot Interaction Researcher at the MIT Media Lab

Commercial BD & Product at Palantir

Researcher at UC Berkeley AutoLAB & immunology labs



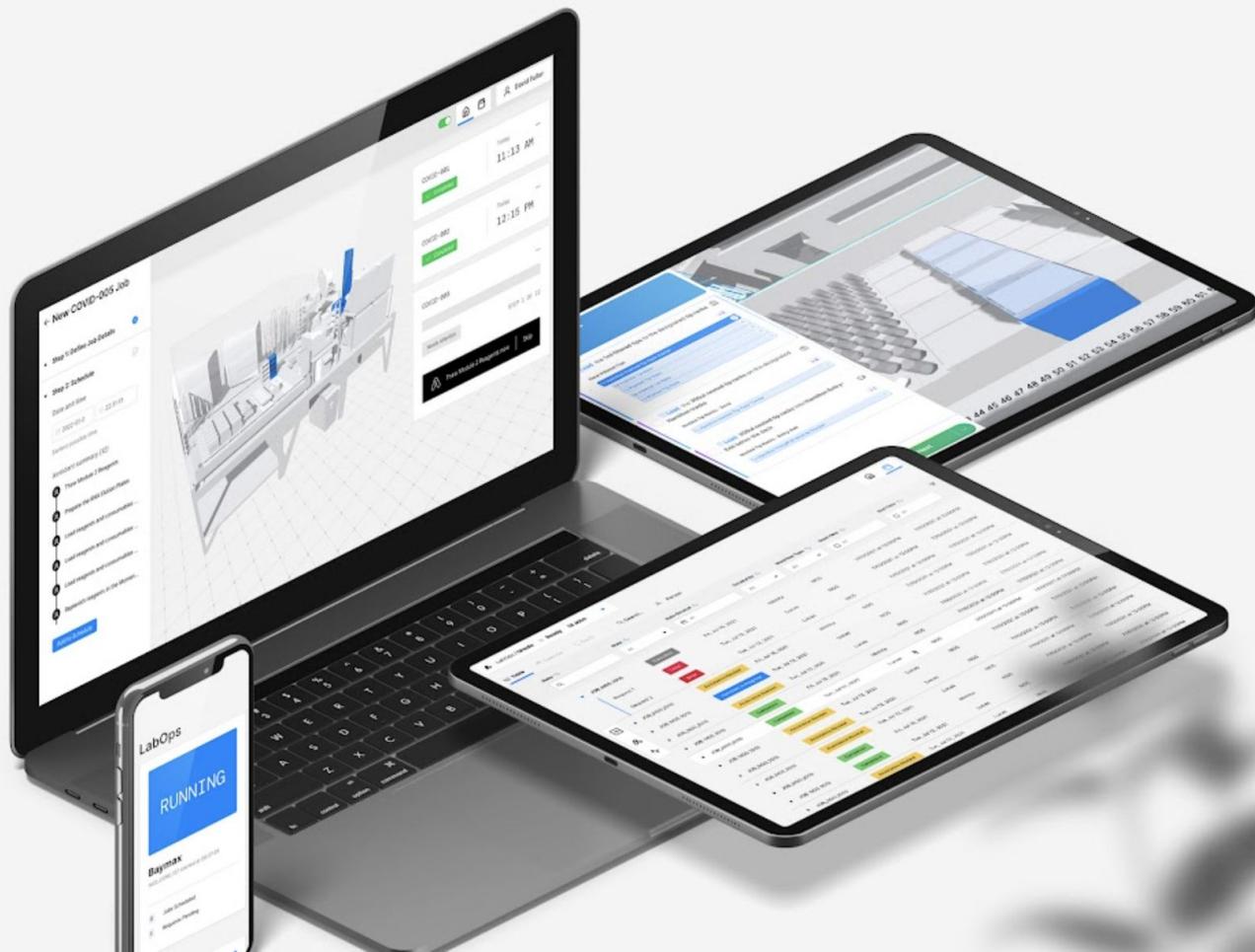
34 team members with breadth and depth in automation, life science and UX.





THE DIGITAL PLATFORM FOR THE MODERN LAB

Artificial is the partner to bring your
lab of the future into today.



www.artificial.com



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