Academy

Building Scalable Agentic Systems for Science

*Concepts, Architectures, and Hands-On with **Academy***

Alok Kamatar, Kyle Chard

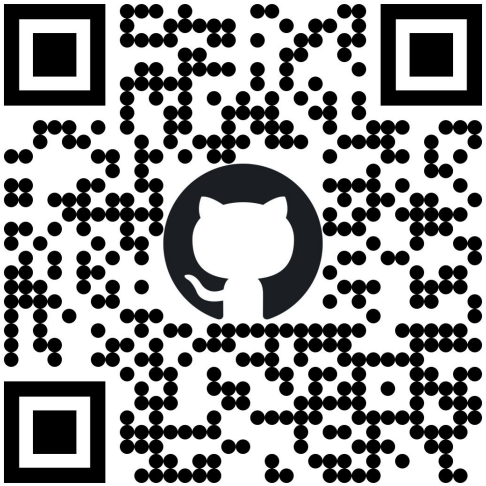
github.com/academy-agents/academy-tutorial

Welcome!

In this tutorial we will cover:

- ➔ Concepts and motivations behind agentic systems
- ➔ Architectures for scalable, distributed agentic workflows
- ➔ Overview of the Academy framework
- ➔ Patterns for integrating with scientific tools and infra
- ➔ Hands-on: build your own agents
- ➔ Discussion: challenges and future directions

Tutorial Materials



github.com/academy-agents/academy-tutorial

Welcome!

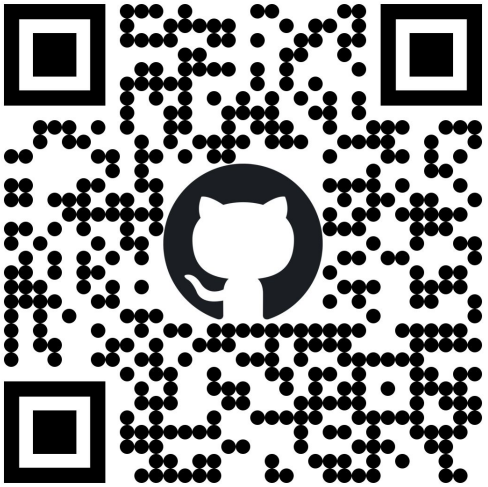
Audience

- ➔ Researchers and scientists exploring AI-driven or autonomous workflows
- ➔ Developers and engineers building tools for HPC and data-intensive systems
- ➔ Anyone interested in how agentic systems can scale and accelerate discovery

Requirements

- ➔ Familiarity with Python (+1 for asyncio experience)
- ➔ MacOS/Linux/WSL with Python 3.10–3.13

Tutorial Materials



github.com/academy-agents/academy-tutorial

Agenda

Time	Topic
8:30 - 9:00	**Introduction**
9:00 - 9:30	**Academy Overview**
9:15 - 10:00	**Hands-on:** Getting Started
10:00 - 10:30	Break
10:30 - 11:00	**Hands-on:** Remote agents
11:00 - 11:30	**Hands-on:** Battleship
11:30 - 11:45	**Demo:** What's next
11:45 - 12:00	**Wrap up**

Room J

Alok Kamatar
UChicago

Kyle Chard
UChicago & ANL

Academy

Introduction

8:30 – 9:00 am

THE UNIVERSITY OF CHICAGO

globus labs

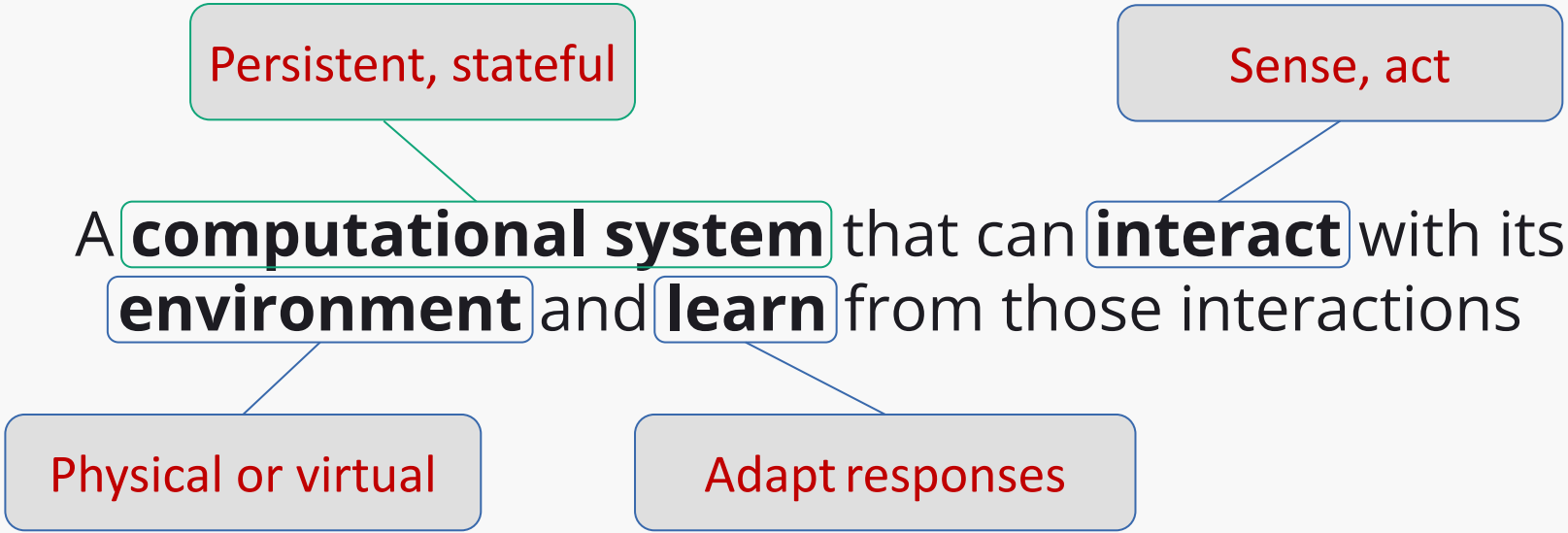
What is an “agent”?

- In computer software, a “software agent” is [Wikipedia] “**a computer program that acts for a user or another program in a relationship of agency**”

- In artificial intelligence (AI), an “intelligent agent” is [also Wikipedia] “**an entity that perceives its environment, takes actions autonomously to achieve goals, and may improve its performance through machine learning or by acquiring knowledge**”
  - An AI component, sensors, actuators, memory

See also: https://gist.github.com/simonw/beaa5f90133b30724c5cc1c4008d0654

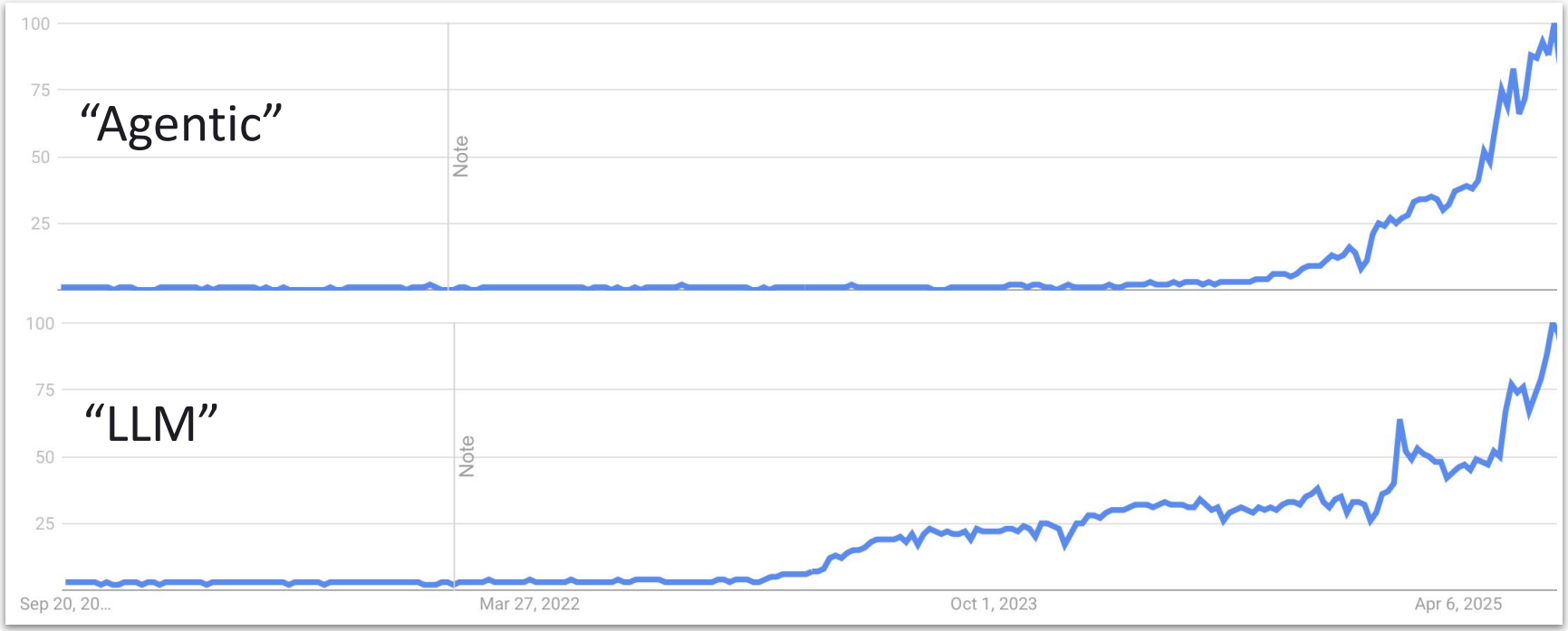
Related concept: An “embodied agent”



The “sense-plan-act-learn” loop

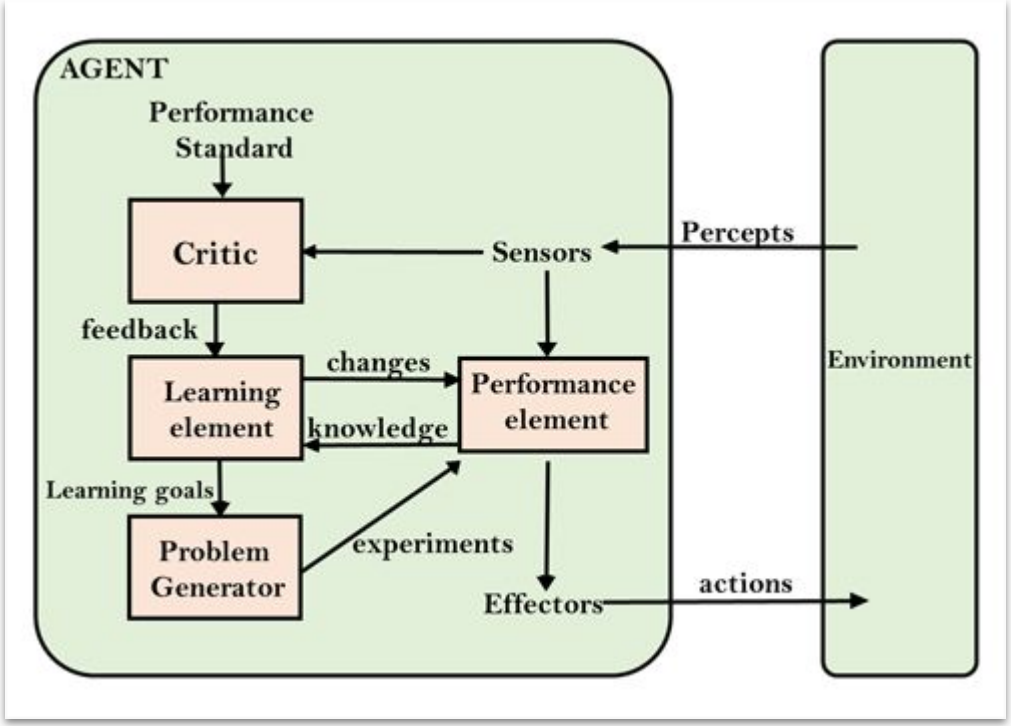
- Initialize state and goals
- Repeat until termination:
  - **Sense**: Gather observations from environment
  - **Plan**: Evaluate goals and state, plan/select next action
  - **Act**: Execute chosen action on environment
  - **Learn**: Update internal state, memory, or model based on outcomes

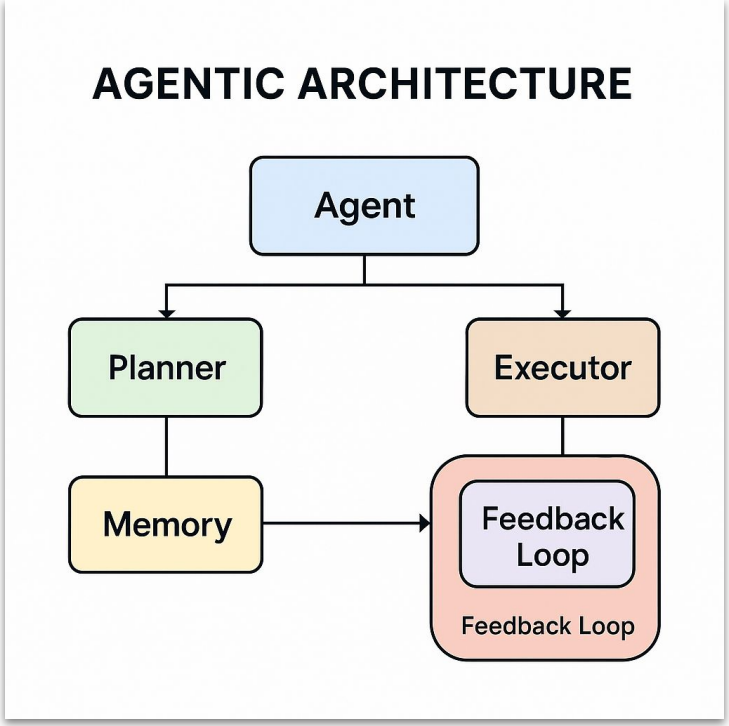
Current excitement around agents is due to LLMs



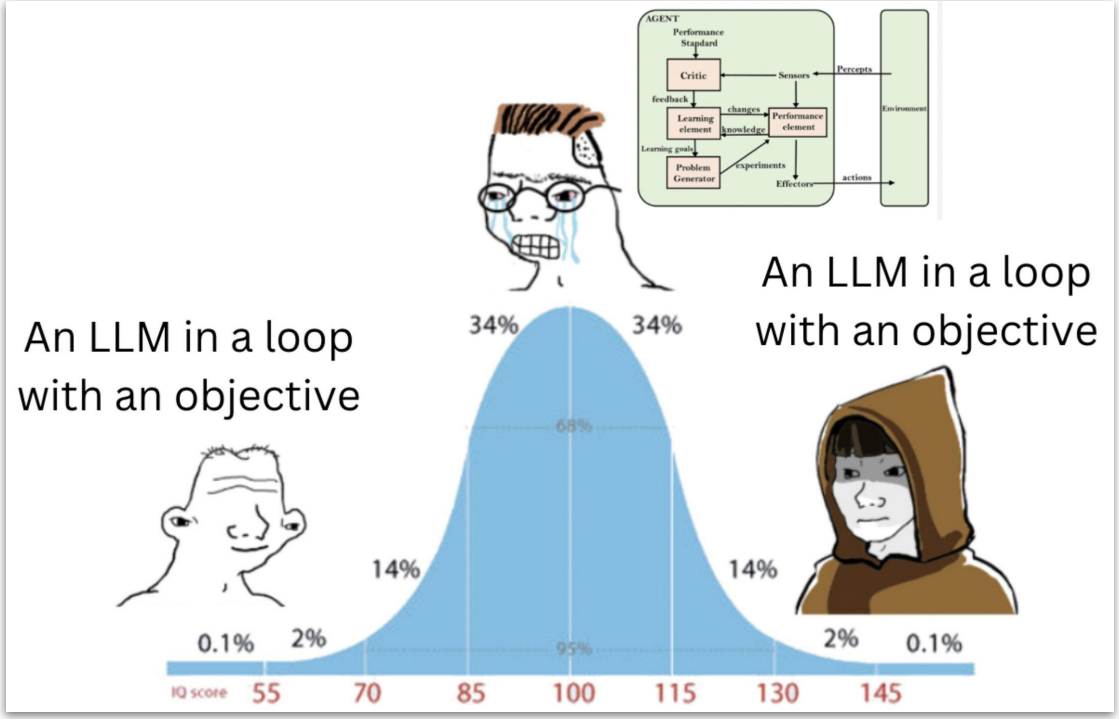
https://trends.google.com

Many related ideas regarding agentic architecture

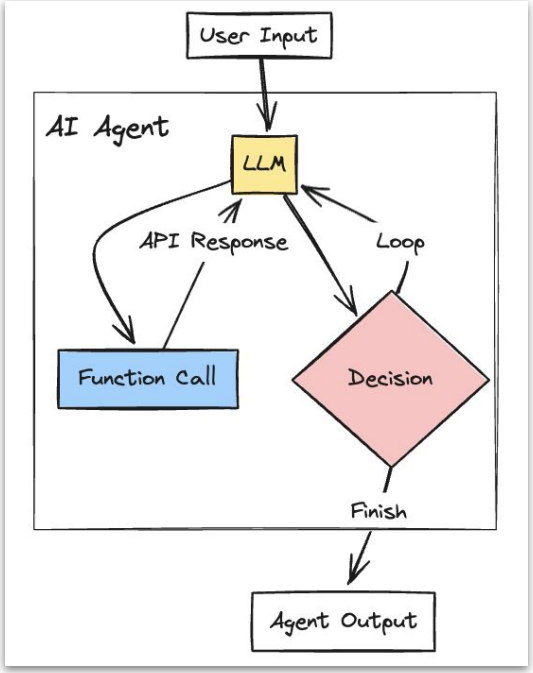




A simple perspective



https://x.com/josh_bickett/status/1725556267014595032



@SullyOmarr

“CACTUS: Chemistry Agent Connecting Tool Usage to Science”

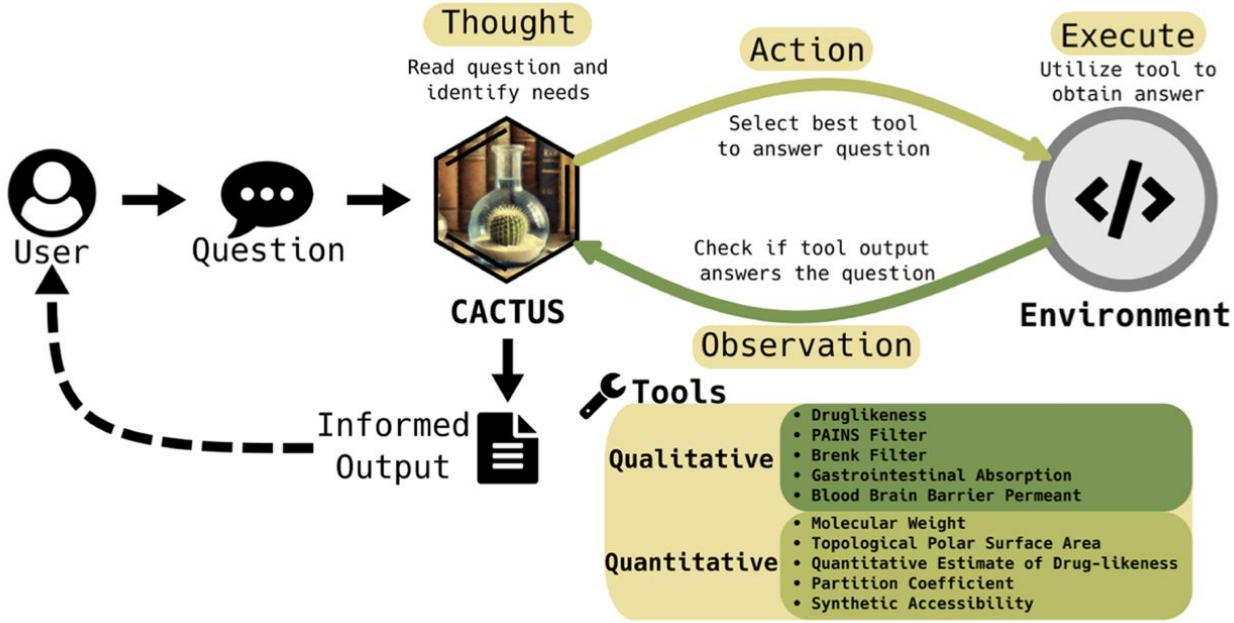


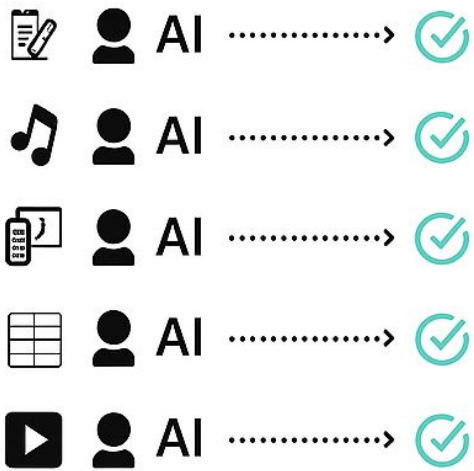
Figure 1. General workflow of the CACTUS agent that details how the LLM interprets input to arrive at the correct tool to use to obtain an answer. Starting from the user input, CACTUS follows a standard “Chain-of-thought” reasoning method with a Planning, Action, Execution, and Observation phase to obtain an informed output.

https://pubs.acs.org/doi/pdf/10.1021/acsomega.4c08408

Overview

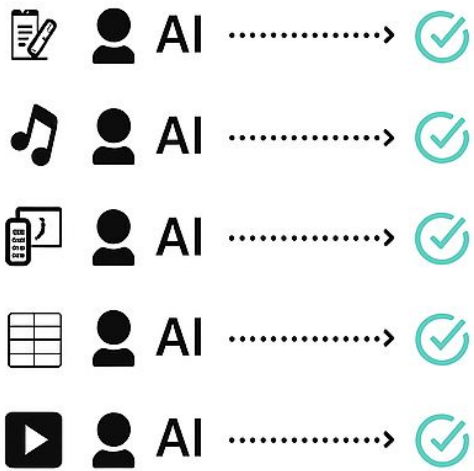
- What is an “agent”?
- **LLMs, foundation models, reasoning models**
- Agents and scientific discovery

Traditional ML



- Individual siloed models
- Require task-specific training
- Lots of human supervised training

Traditional ML



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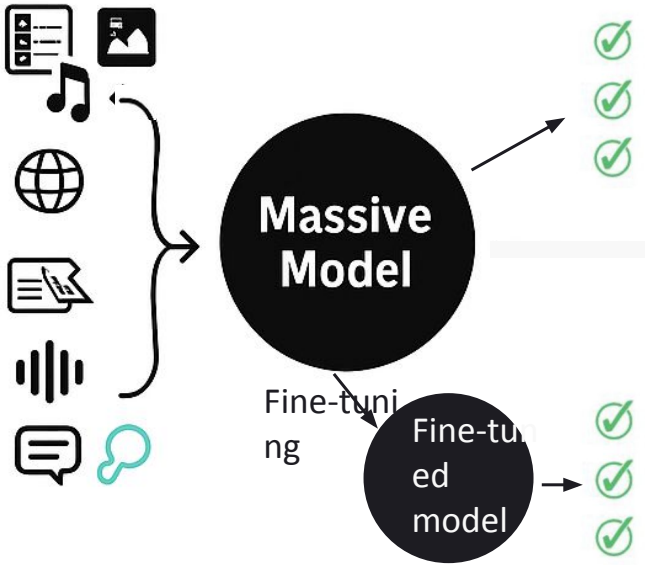
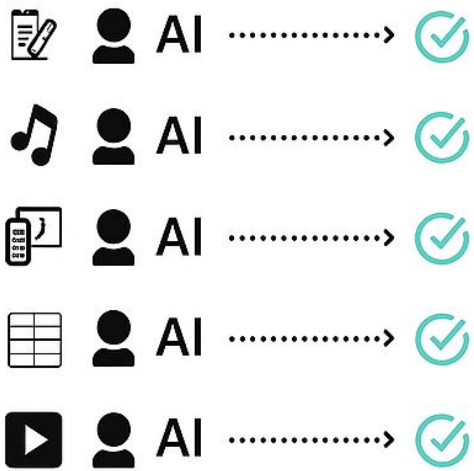
Foundation models

(E.g., Large Language Models: LLMs)



- Massive multi-modal model
- Adapted with minimal training
- Pre-trained unsupervised learning

Traditional ML



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Foundation models

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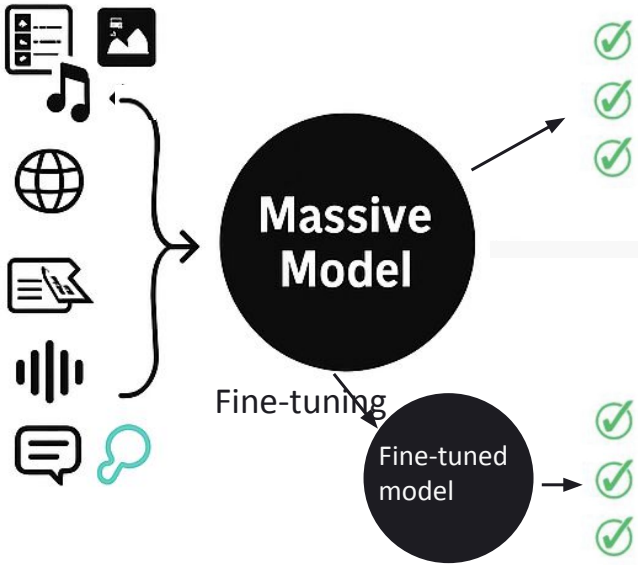

- Massive multi-modal model
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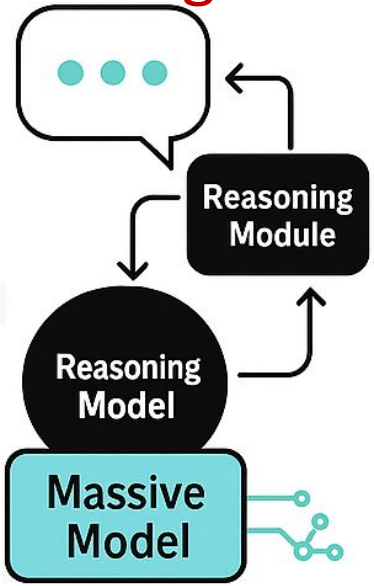
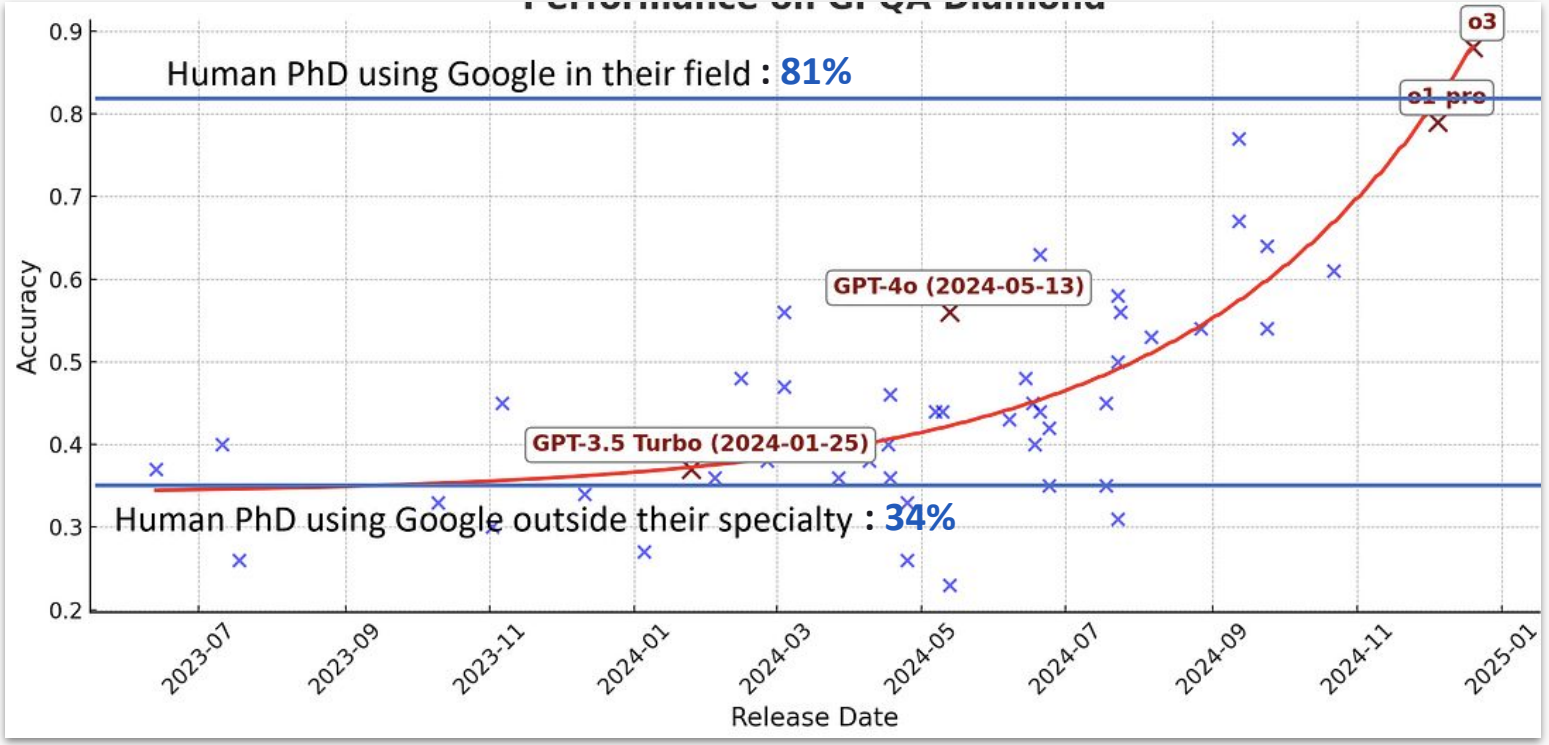
Reasoning models



- Deliberative multi-step logic
- Self-consistency checks
- Slower but more accurate inference

Graduate-Level Google-Proof Q&A test (GPQA), Diamond problems



https://arxiv.org/pdf/2311.12022

https://epoch.ai/data/ai-benchmarking-dashboard

Overview

- What is an “agent”?
- LLMs, foundation models, reasoning models
- **Agents and scientific discovery**

Replacing the Human-in-the-Loop

Humans synthesize knowledge and propose hypotheses

Humans write, debug, and run programs

Humans interpret results to inform new hypotheses

} Inefficient use of research infrastructure

Agents can be the driving entities

- ➔ Persistent, stateful, cooperative
- ➔ Intermittent human oversight

} We need to be here

Credit: Ian Foster, "**Empowering Science with Intelligent Middleware and Embodied Agents**"

Agentic Workflows for Science

- ✓ Automate closed-loop processes
- ✓ Natural expression of scientific resources (compute, instruments, repositories)
- ✓ Operate autonomously but still cooperatively
- ✓ Execute multi-stage computational science processes
- ✓ Reduce mundane tasks & responsibilities of scientists

The whole is greater than the sum of its parts.
- Aristotle

Agentic Patterns Beyond LLMs

Conversational Assistants

Human

Provide the SMILES string corresponding to this molecule: 1-(2-methylphenyl)-3-(3-methylpyridin-2-yl)urea

ChemGraph

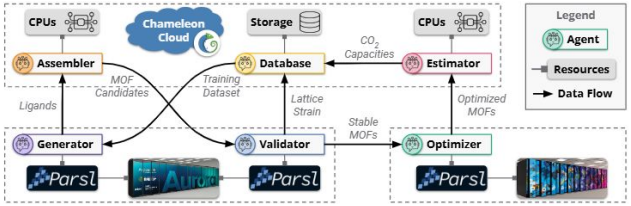
I'll help you find the SMILES string for the molecule 1-(2-methylphenyl)-3-(3-methylpyridin-2-yl)urea. To do this, I'll use the molecule_name_to_smiles function. However, in this case, the input is a systematic chemical name rather than a common molecule name, so the function might not work directly.

[...]

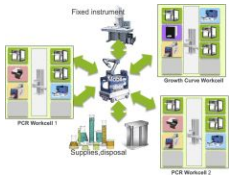
Would you like me to help you find alternative ways to represent this molecule?

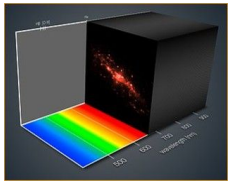
Human

Multi-Site Applications

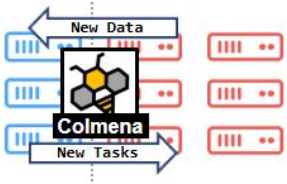


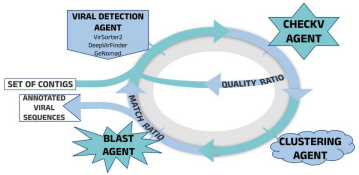
Integrating Instruments/Experiments





Steering Workflows



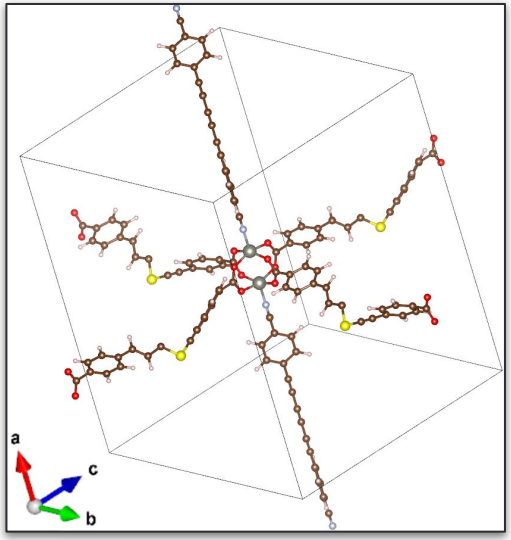


Use Case: **MOF Discovery**

Metal Organic Frameworks (MOF)

- ➔ Composed of organic molecules (ligands) and inorganic metals (nodes)
- ➔ The sponges of materials science!
- ➔ Porous structures that adsorb and store gases
- ➔ Topologies can be optimized for targeted gas storage → **Carbon Capture**

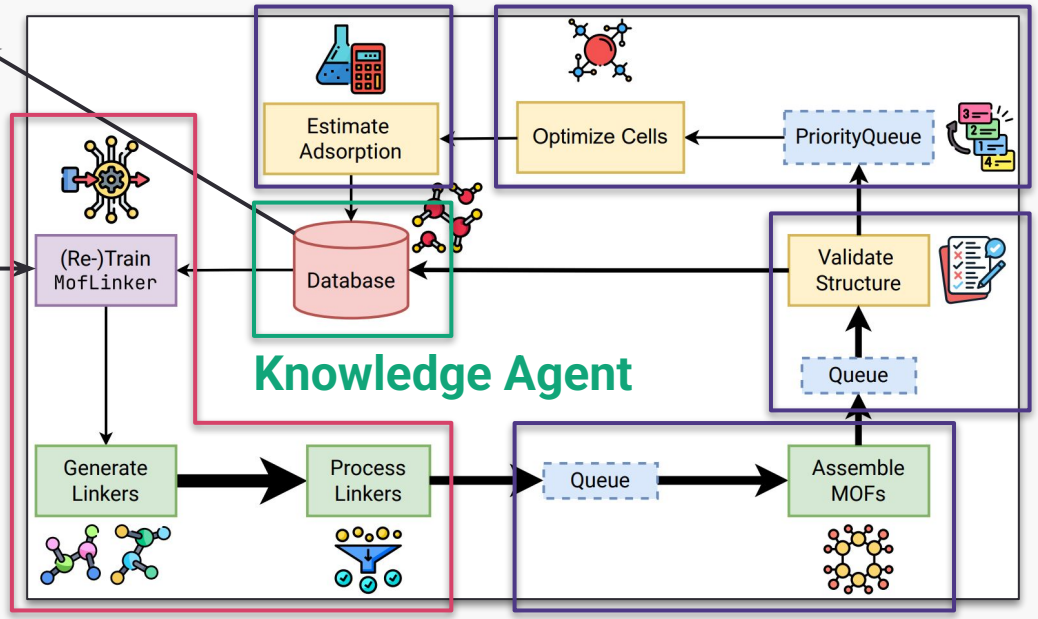
How to efficiently discover MOFs with desirable properties for target applications?



Intractable search space of ligand, node, & geometry combinations

MOFA: Online learning + GenAI + Simulation

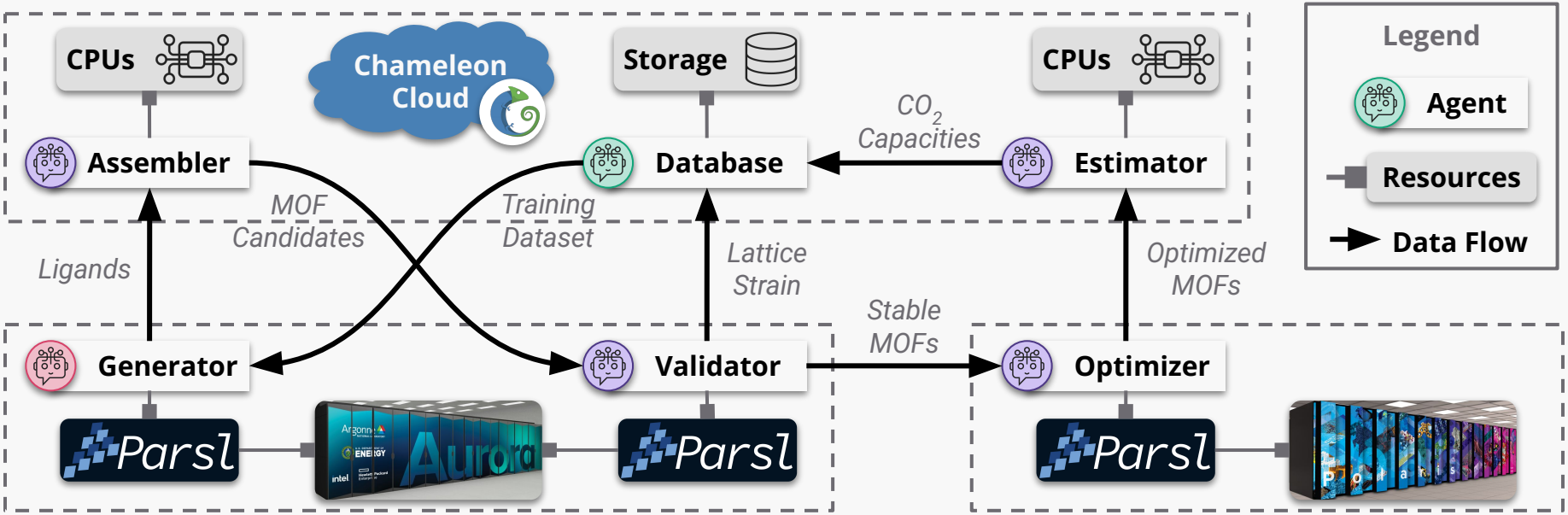
Embodied Agents*



Computational Agents

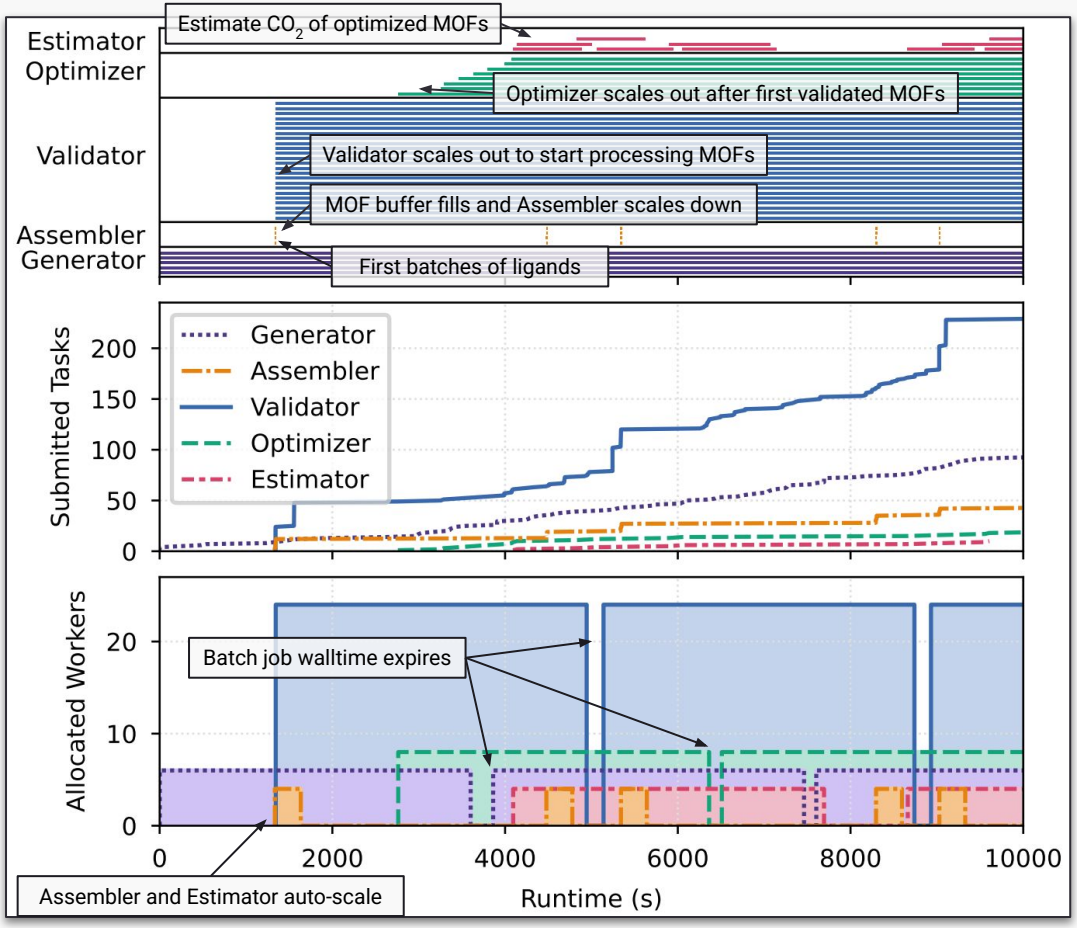
Yan et al., "**MOFA: Discovering Materials for Carbon Capture with a GenAI- and Simulation-Based Workflow**" (Under Review)

MOFA through Autonomous Agents



Agents executed remotely via Globus Compute

MOFA Agents Trace



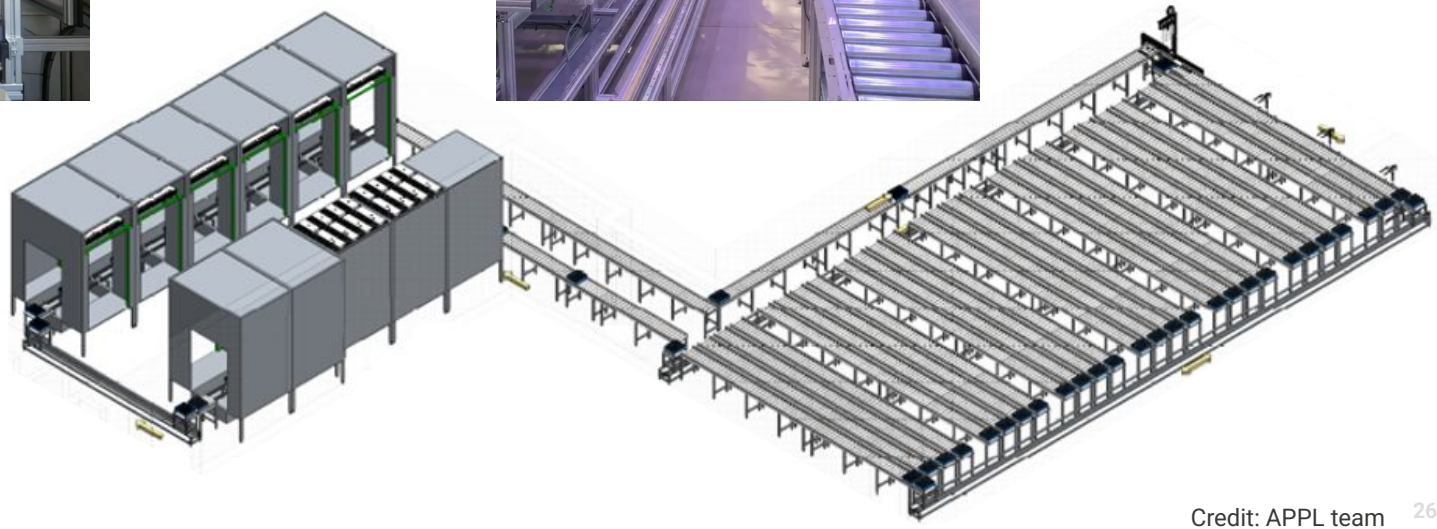
Why is this agentic model better?

- ➔ **Placement:** Move agents to resources
- ➔ **Separation of concerns:** Resource acquisition and scaling based on local workload
- ➔ **Loose coupling:** Swap agents or integrate new agents (e.g., SDL)
- ➔ **Shared agents:** Multiple workflows can share agents (microservice-like)

APPL is an automated 520-tray conveyor system that continually monitors plants using multimodal imaging.

Buffer

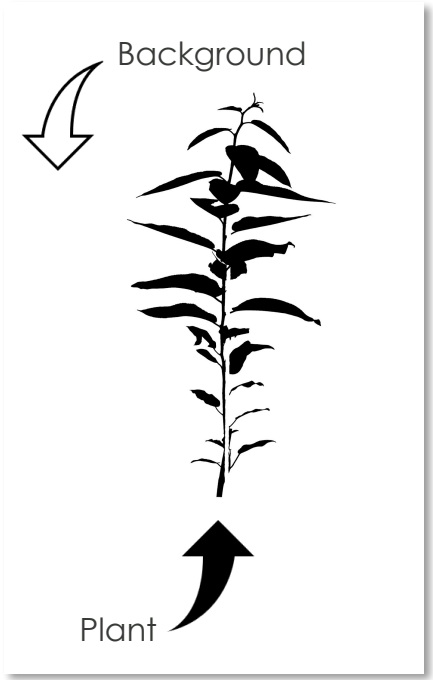
Imaging loop

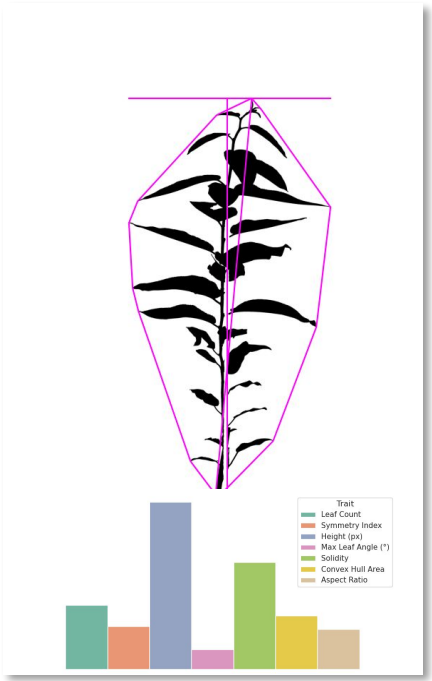


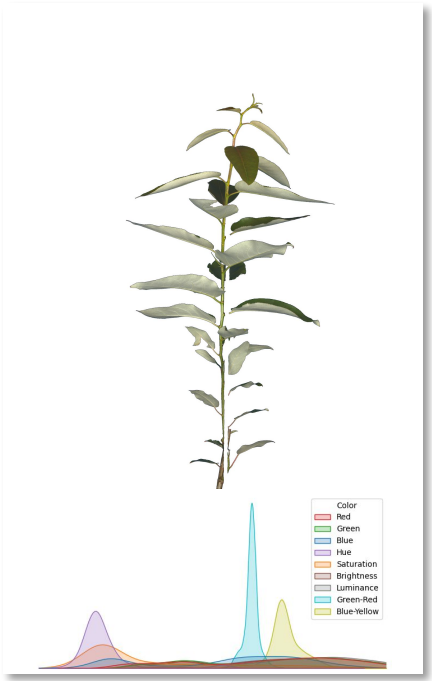
Credit: APPL team

Accurate image segmentation enables prediction of complex plant phenotypes

Original → Segmentation → Morphology → Spectral traits







Credit: APPL team

Daniel Rosendo

Renan Souza

Scientist

Genesis Mission
Platform Deployment for OPAL

Cloud

- **Model Services** *Model Catalog*
- **Intelligent Int.** *LiteLLM Inference*
- **i2 Auth** *Globus / Google*
- **Metadata Services** *Data lakehouse*
- **Co-pilot Agent** *Academy*
- **Chat UI** *Chainlit*
- **Provenance Service** *Flowcept*
- **Kubernetes cluster**
- aws

S3M

OLCF

- **ViT inference** *Parsl* — **Compute node**
- **Compute Agent** *Academy* — **Login node**
- **Lustre filesystem**
- FRONTIER

APPL

Plant images + experiment metadata

Platform

Legend

- APPL components
- Frontier
- AmSC services
- AWS services

Demo video
https://www.youtube.com/watch?v=7szA15ncDx0

Credit: APPL team

AI-Enabled Integrated Enabled Intelligence System for the WHO African Region

World Health Organization
REGIONAL OFFICE FOR Africa

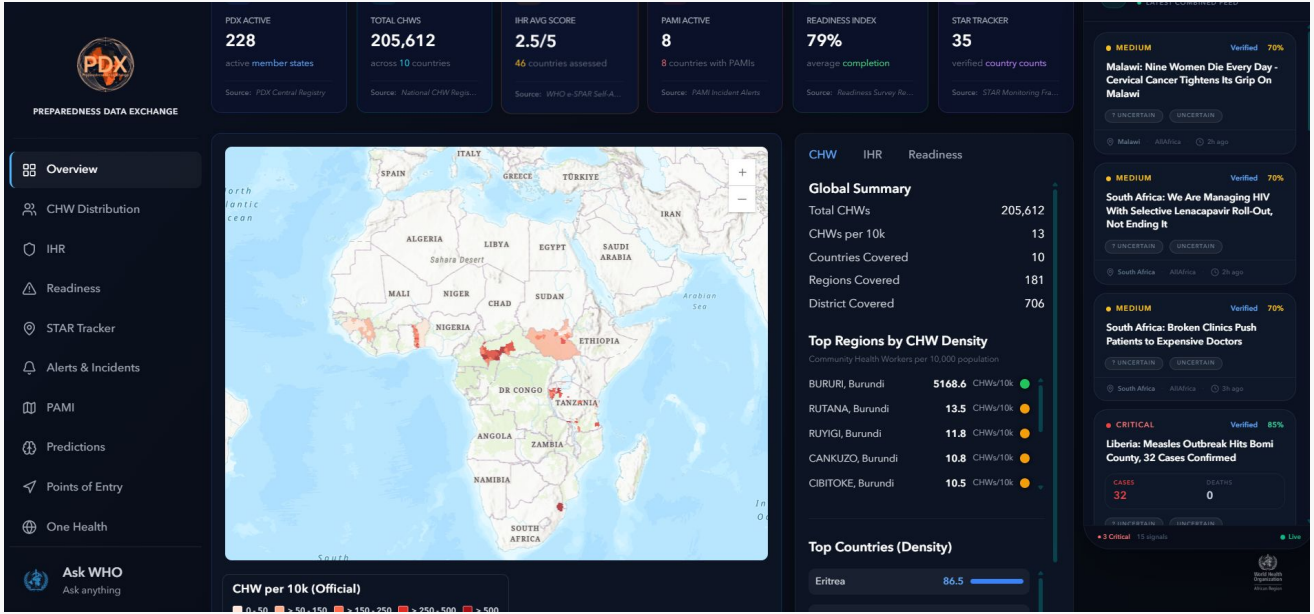
Credit: Isaias Fernandes

Preparedness data exchange aggregates and monitors regional data sources in near real time

Academy agents continuously analyze signals and triggers actions (e.g., notifications to public health workers, policymakers, WHO)

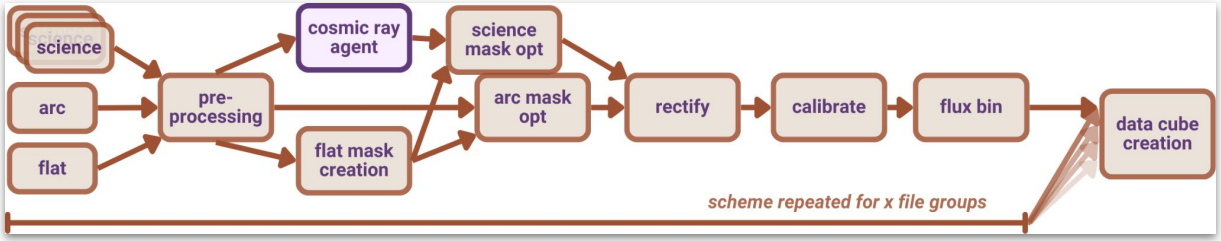
Enables **proactive response and coordination** through automated insights and alerts

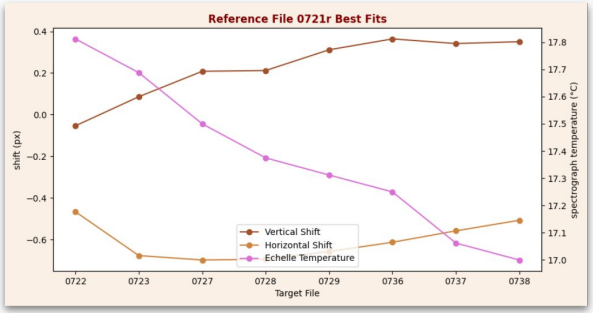
Supports **local deployment** to ensure compliance with data sovereignty and governance requirements

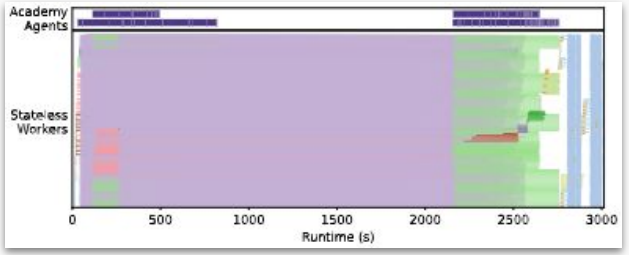


Use Case: **Integral Field Unit Spectroscopy**

- ➔ Highly-sensitive to instrument calibration
- ➔ Optical parameters are **continuous in time**
- ➔ Resolution and speed can be improved using **stateful processing**

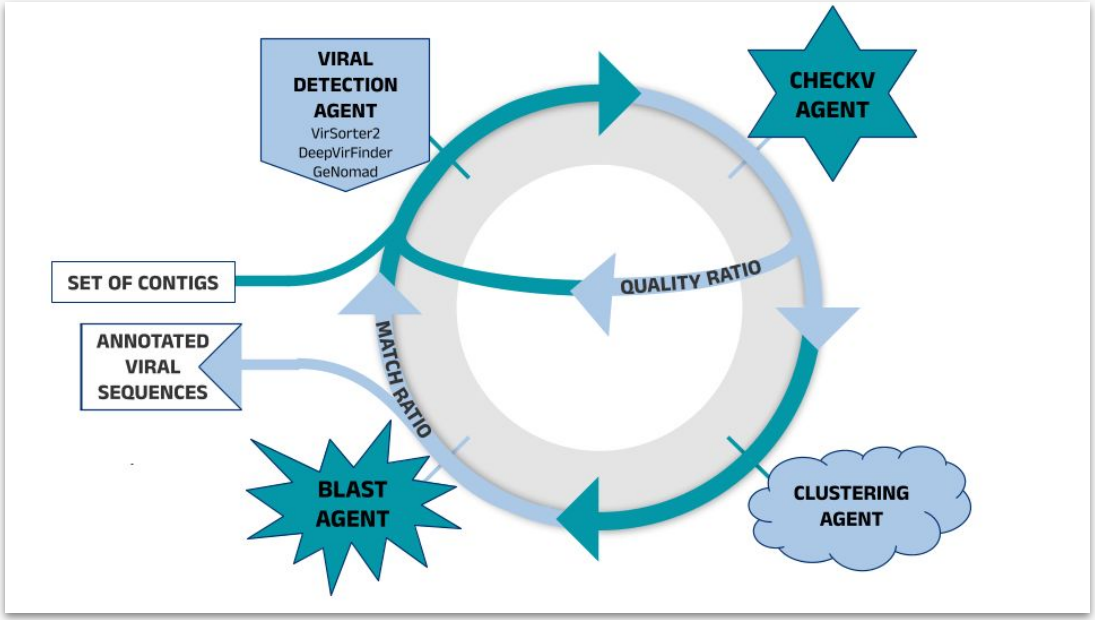






Use Case: **Viral Microgenomics**

- ➔ Multiple tools exist to complete the same tasks (i.e. viral detection)
- ➔ Workflow construction is manual and heuristic
- ➔ Can we learn from downstream metrics to automate workflow design?



The Future? The Scientific Method through Agents

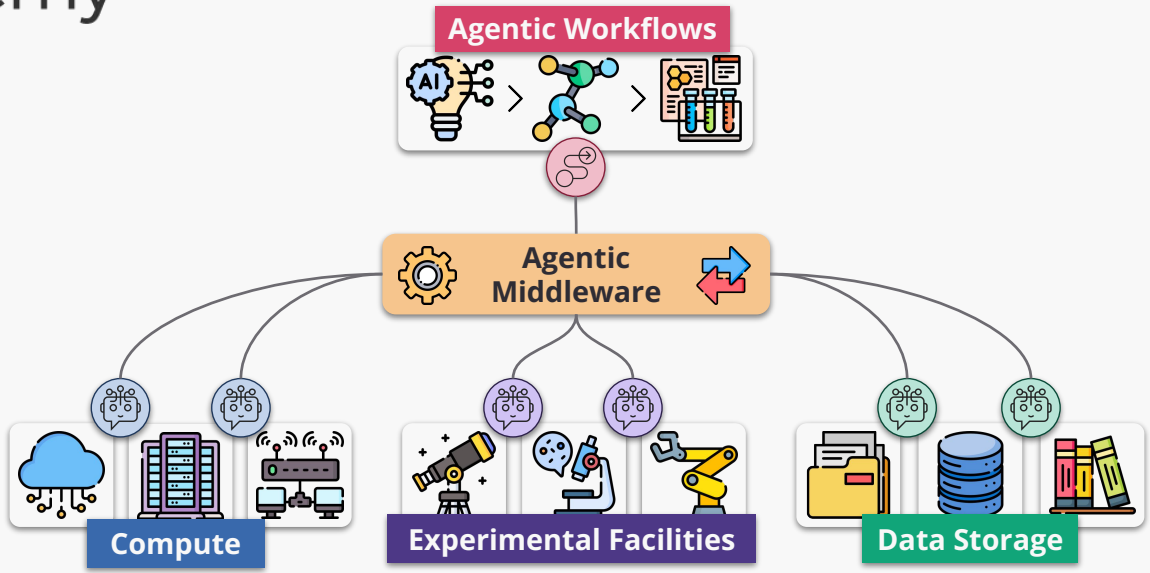
Questions?

Up next → Academy Overview

Academy Overview

9:00 – 9:30 am

Academy

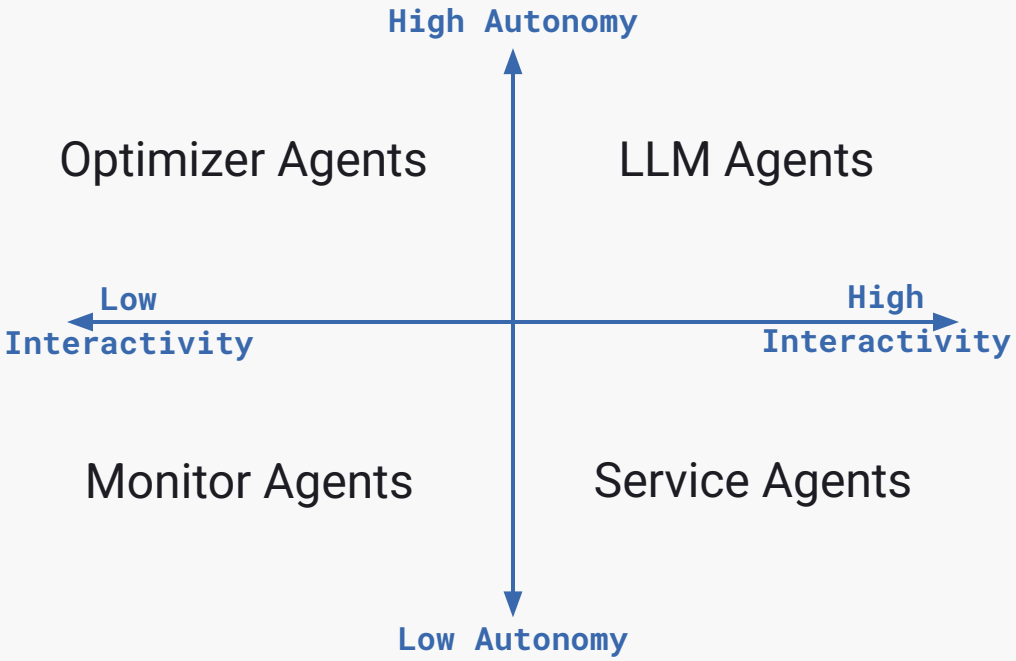


A middleware for building and deploying stateful actors and autonomous agents across distributed research infrastructure

Agentic Middleware

Software layer that transparently manages the lifecycle, communication, and coordination of autonomous agents across distributed computing environments.

Agentic Middleware: Agent Behaviors



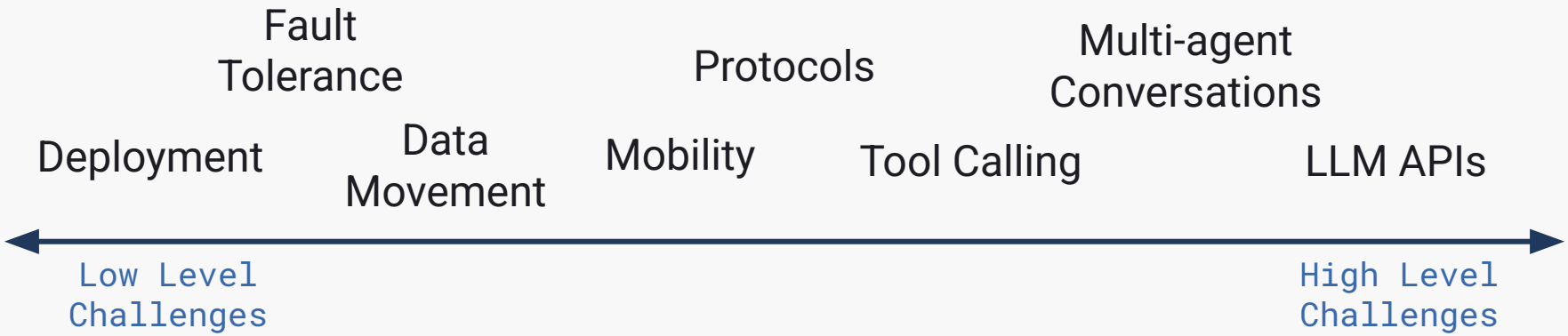
Other defining aspects:

- Persistent vs ephemeral
- General vs narrow purpose
- Embodiment

Long-running agentic science apps will incorporate many kinds of agent behaviors.

Academy primitives support the creation diverse agent types.

Agentic Middleware: Scope & Challenges

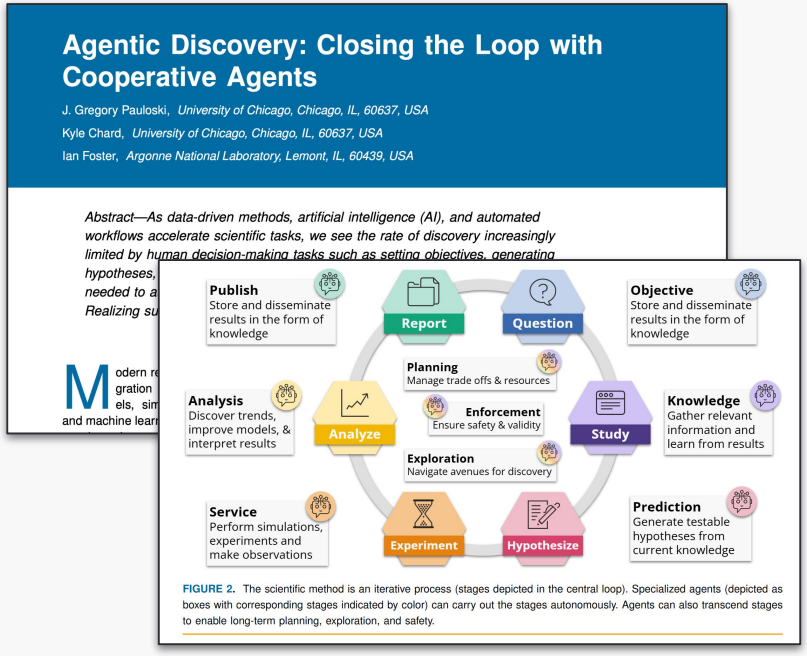


Academy → **Cool Science?** ← **LangChain, AutoGen, Pydantic AI, etc.**

Agentic Middleware: Scope & Challenges

- ➔ Access & privileges
- ➔ Agent discovery
- ➔ Asynchronous communication
- ➔ Fault tolerance
- ➔ Interfaces
- ➔ Mobility
- ➔ Persistent stateful execution
- ➔ Provenance
- ➔ Many more…

Initial focus areas



Agentic Discovery: Closing the Loop with Cooperative Agents

J. Gregory Pauloski, *University of Chicago, Chicago, IL, 60637, USA*
Kyle Chard, *University of Chicago, Chicago, IL, 60637, USA*
Ian Foster, *Argonne National Laboratory, Lemont, IL, 60439, USA*

Abstract—As data-driven methods, artificial intelligence (AI), and automated workflows accelerate scientific tasks, we see the rate of discovery increasingly limited by human decision-making tasks such as setting objectives, generating hypotheses, needed to a Realizing su

Modern re gration els, sim and machine learn

FIGURE 2. The scientific method is an iterative process (stages depicted in the central loop). Specialized agents (depicted as boxes with corresponding stages indicated by color) can carry out the stages autonomously. Agents can also transcend stages to enable long-term planning, exploration, and safety.

Published in IEEE Computer Oct 2025
https://arxiv.org/abs/2510.13081

Agentic Middleware: Using Research Infrastructure

Centralized

- Agents co-located (workstation, cloud)
- Research infrastructure available via APIs (REST, SDKs, MCP Servers, …)
- Use infrastructure via tool calling

++ Rapidly growing library ecosystem
−− Limited APIs for infrastructure

LangChain, AutoGen, Pydantic AI, etc.

Decentralized

- Agents distributed across infrastructure
- Agents interact asynchronously
- Use infrastructure directly (actuate a robot, submit job, …)

++ Data locality, perf., loose coupling
−− Deployment complexity

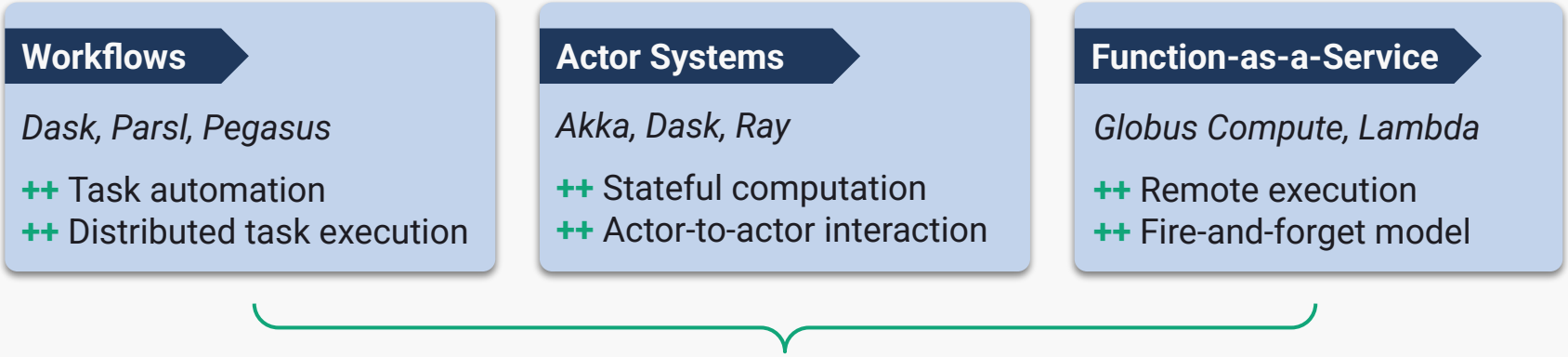
Academy

How does **Academy** support the expression of **diverse agent behaviors** and deployment across **distributed/federated resources**?

Requirements

- ➔ Federated orchestration
- ➔ Configurable data plane
- ➔ Temporally decoupled messaging
- ➔ Agent authentication and permissions
- ➔ Resilient state management

Inspiration

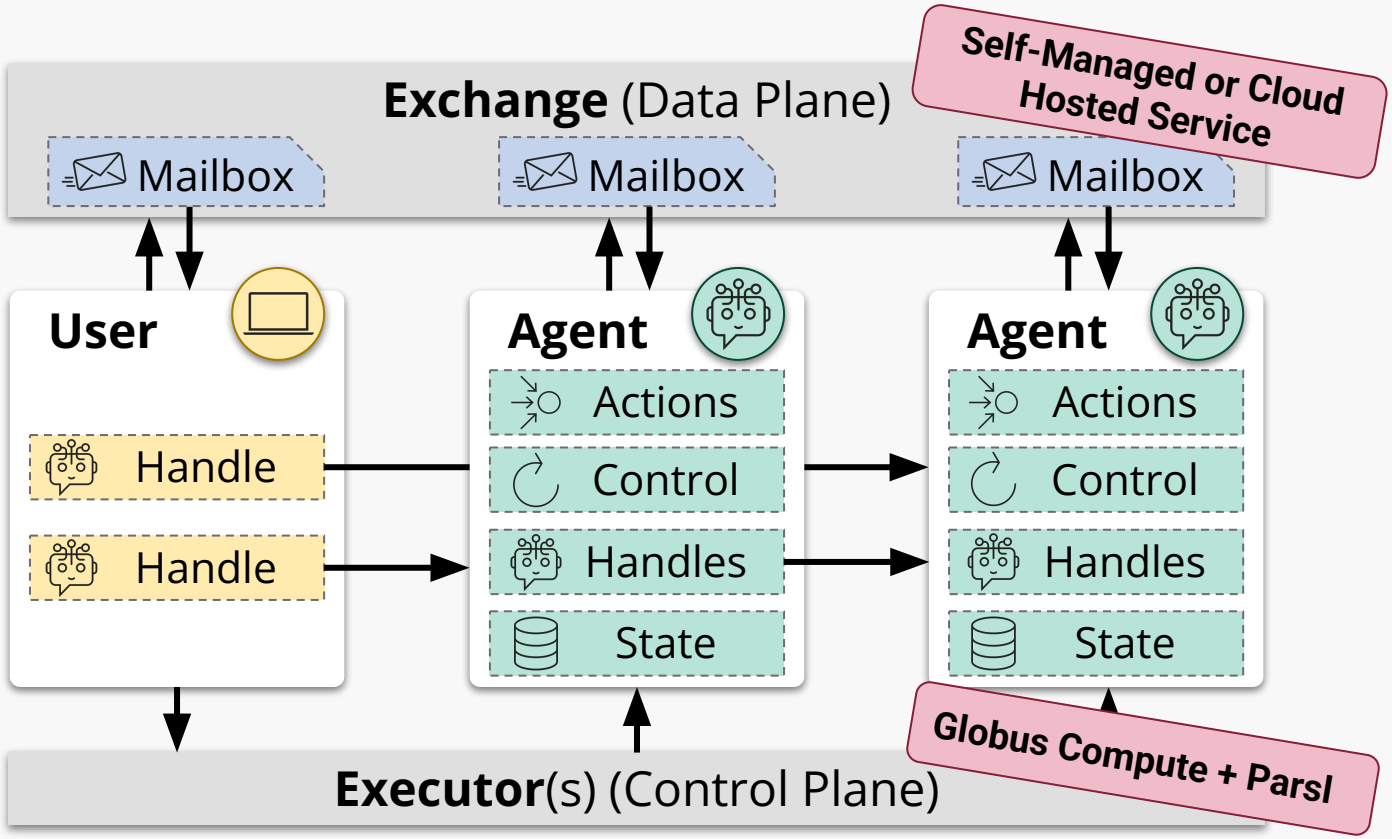


- *Fire-and-forget*: Agents spawned across remote/federated resources
- *Autonomy*: Agents have agency over their actions and local state/resources
- *Cooperative*: Agents interact to execute tasks & workflows

Focus 3: Coordinate async agent messaging

Focus 1: Program diverse agents and interactions

Focus 2: Deploy agents on federated resources



https://docs.academy-agents.org/latest/concepts/

Diverse Communication Options

Local Exchange

➔ In-memory, no setup, for local applications or fast debugging

Hybrid Exchange

➔ Direct communication first, with mediated fallback for resilience

➔ Leverage high-speed interconnects within clusters/sites

Cloud Exchange

➔ Http service authenticated with Globus

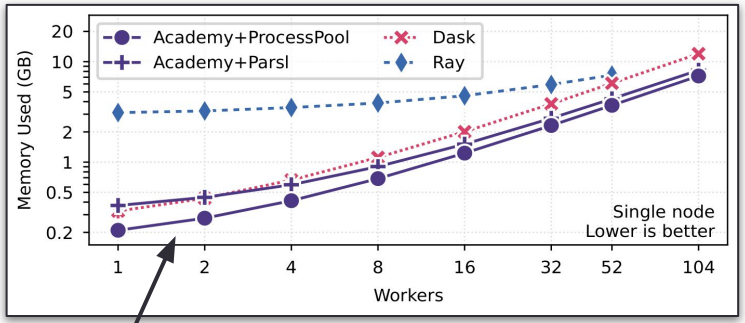
➔ Secure multi-site applications

Features (rapid fire)

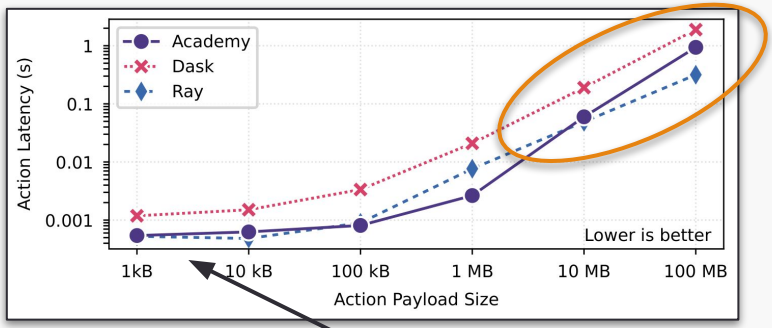
- ➔ Any number of actions & control loops
- ➔ Special purpose control loop decorators
- ➔ Async/non-blocking action execution
- ➔ Startup and shutdown callbacks
- ➔ State persistence plugins
- ➔ Re-execution on failure
- ➔ Agents can launch other agents
- ➔ Discovery/lookup based on behavior

Comparisons to Actor Systems

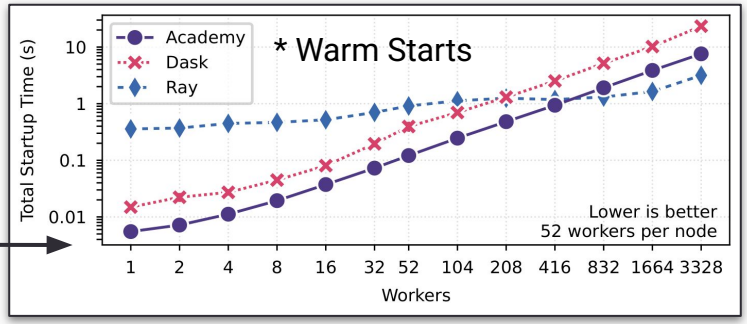
Why we need ProxyStore!



Low-memory overhead



Low-latency messaging



Fast start-up

Experiments performed on Aurora @ ALCF

Writing Apps in Academy

Agents defined by a class

Clients & other agents can request actions

```python
import asyncio
from academy.agent import Agent, action, loop

class Example(Agent):
    def __init__(self) -> None:
        self.count = 0  # State stored as attributes

    @action
    async def square(self, value: float) -> float:
        return value**2

    @loop
    async def count(self, shutdown: asyncio.Event):
        while not shutdown.is_set():
            self.count += 1
            asyncio.sleep(1)
```

Instance of a agent is state

Control loops for autonomous behavior

https://docs.academy-agents.org/stable/get-started/

Single interface for managing your agents

Launch agent and get handle

Interact with agents via handles

```python
from academy.exchange import HybridExchangeFactory
...
from academy.manager import Manager

gce = GlobusComputeExecutor('<UUID>')

async with await Manager.from_exchange_factory(
        factory=HybridExchangeFactory(),
        executors=gce,
) as manager:
    behavior = Example()  # From the prior slide
    handle = await manager.launch(behavior)

    result = await handle.square(2)
    assert result == 4

    await handle.shutdown()
```

Launch agents via Globus Compute

https://docs.academy-agents.org/stable/get-started/

```python
from academy.agent import Agent, action
from academy.handle import Handle

class Coordinator(Agent):
    def __init__(self, simulator: Handle[Simulator]) -> None:
        self.simulator = self.simulator

    def process(self, result: Result) -> Result: ...

    @action
    async def compute_property(self, smiles: str) -> float:
        result = await self.simulator.simulate(smiles)
        # Run sync code in thread
        processed = await self.agent_run_sync(self.process, result)
        return processed
```

Call sync libraries from async actions

Pass handles to other agents or between processes

Integrating Academy and LLMs

```python
from academy.handle import Handle
from langchain_core.tools import tool

def make_sim_tool(handle: Handle[MySimAgent]):
    @tool
    async def compute_property(smiles: str) -> float:
        """Compute molecule property."""
        return await handle.compute_property(smiles)
    return compute_property

tool = make_sim_tool(agent_handle)
print(tool.args_schema.model_json_schema())
```

Turn agent handles into LLM framework “tools”

Comparison to Alternatives

Tool Servers (MCP) **Academy-MCP Plugin**

Rely on externally reachable endpoints that are blocked by facility policies. Requires user to manage services, infrastructure, and VPNs

Func-as-a-Service (Globus Compute)

Easier remote execution (no VPN, infrastructure management) but tools must be stateless, short-running tasks

Recap

Build

➔ Unified framework for creating diverse, stateful, and autonomous agents

Deploy

➔ Run and coordinate agents seamlessly across federated HPC resources

Integrate

➔ Connect agents with LLMs, MCP servers, instruments, robots, and more

Evolve

➔ Design agentic workflows that are composable, resilient, and self-managing

Next we'll build some some simple agents

Questions?

Up next → Hands-on: Getting Started

Academy

Hands-on: Getting Started

9:30 – 10:00 am

github.com/academy-agents/academy-tutorial

Setup

Checkout the tutorial repo

```
$ git clone https://github.com/academy-agents/academy-tutorial
$ cd academy-tutorial
```

Install dependencies in a virtual environment

Native

```
$ python -m venv venv
$ source venv/bin/activate
$ pip install -e .
```

Conda

```
$ conda create -n academy python=3.12
$ conda activate academy
$ pip install -e .
```

UV

```
$ uv venv --python 3.12
$ source .venv/bin/activate
$ uv pip install -e .
```

Your First Academy Application

Goal: Write an Counter Agent

- **State:** Count
- **Actions:** Increment, Get_Count
- **Tips:**
  - Use `LocalExchangeFactory` for communication

Define an agent class with state

```python
import asyncio
from academy.agent import Agent, action, loop

class Example(Agent):
    count: int

    async def agent_on_startup(self) -> None:
        self.count = 0

    @action
    async def increment(self, value: int = 1) -> None:
        self.count += value

    @action
    async def get_count(self) -> int:
        return self.count
```

State can be initialized on __init__ or with on_startup method

Actions define methods that can be invoked over the exchange

Manage the launch and communication of agents

```python
from academy.exchange.local import LocalExchangeFactory
from academy.manager import Manager


async with await Manager.from_exchange_factory(
    factory=LocalExchangeFactory(),
    executors=ThreadPoolExecutor(),
) as manager:
    handle = await manager.launch(Example)

    await handle.increment()
    result = await handle.get_count()
    assert result == 1
```

Launch agent and get handle

Interact with agents by invoking actions

Adding a Control Loop

Goal: Add “autonomous” behavior to agents

Change `increment` to count every second

```python
import asyncio
from academy.agent import Agent, action, loop

class Example(Agent):
    ...
    @loop
    async def increment(self, shutdown: asyncio.Event):
        while not shutdown.is_set():
            await asyncio.sleep(1)
            self.count += 1
```

Agent Cooperation

Goal: Call agent internally from another agent

- Create a Coordinator Agent
  - **Actions:** process: lowers a string
  - Use **Lowerer** to accomplish task

Handles bind to mailboxes based on **context**

```python
import asyncio
from academy.agent import Agent, action

class Coordinator(Agent):
    def __init__(self, lowerer, reverser):
        self.lowerer = lowerer
        self.reverser = reverser

    @action
    async def process(self, text: str) -> None:
        reversed = await self.reverser(text)
        return await self.lowerer(reversed)
```

Pass Agent handles

Agents can communicate via the exchange too!

```python
from academy.exchange.local import LocalExchangeFactory
from academy.manager import Manager


async with await Manager.from_exchange_factory(
    factory=LocalExchangeFactory(),
    executors=ThreadPoolExecutor(),
) as manager:
    ...
    coordinator = await manager.launch(
        Coordinator,
        args=(lowerer, reverser),
    )
    ...
    result = await coordinator.process(text)
    print(result)
```

Agent initialized with handle

LLM Integration

Academy interoperates with existing LLM wrappers

Goal: Use LangChain + Academy to build a team of distributed agents

- Tell the LangChain agent about Academy actions as **tools**
- Create a complete communication network between launched agents

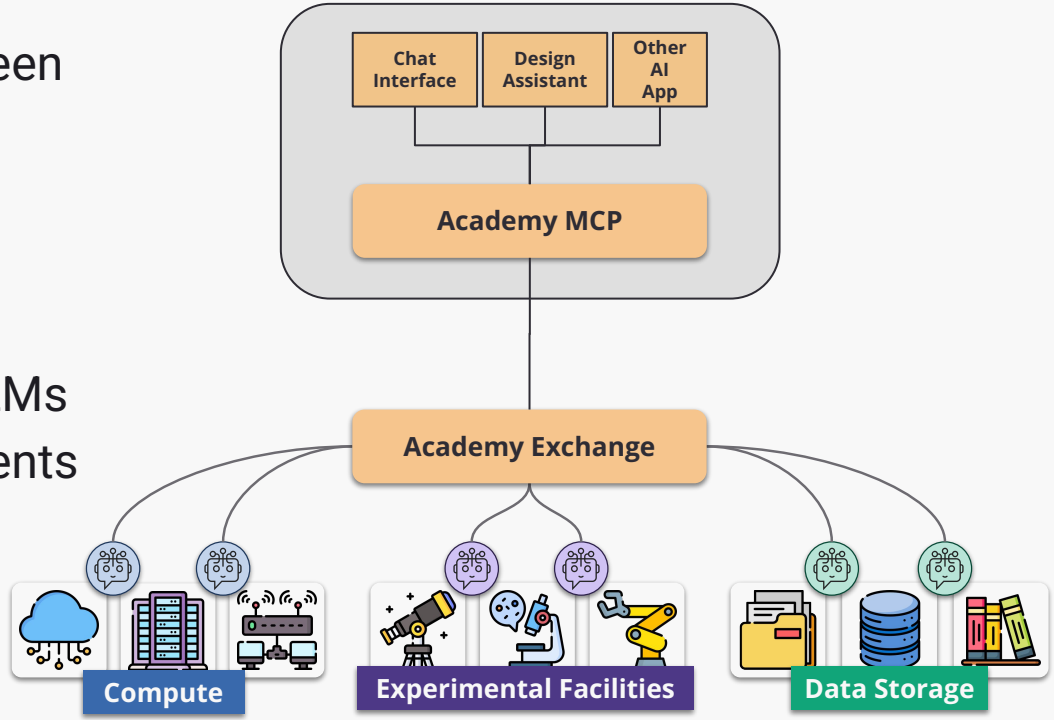
Actions can be passed as tools to LLMs

```
from langchain import create_agent

    ...
    self.agent = create_agent(
        model=self.model,
        tools=[self.share_information,],
    )
    ...

    ...
    agent_registrations.append(
         await manager.register_agent(WordleAgent),
    )
```

Mailboxes are minted before launch to create circular dependencies

Other features: Academy-MCP Plug-in

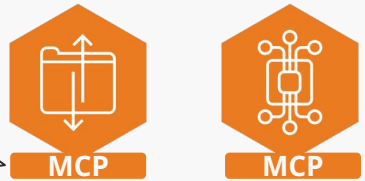
- ➔ Local MCP server bridges between Academy agents and AI applications
- ➔ Turn Academy agents into LLM **tools**
- ➔ Expose agentic **workflows** to LLMs
- ➔ Automatic **discovery** of new agents



Other features: Globus MCP servers

- Enable LLMs and agentic systems to manage data and computation across remote resources
  - Various transfer and compute capabilities supported with open Globus MCPs
  - Authentication via Globus client credentials

Tools:
- submit_transfer_task()
- get_task_events()
- …



Tools:
- list_my_endpoints()
- register_python_function()
- register_shell_command()
- submit_task()
- get_task_status()

Academy

Break

10:00 – 10:30 am

Academy

Hands-on Remote Agents

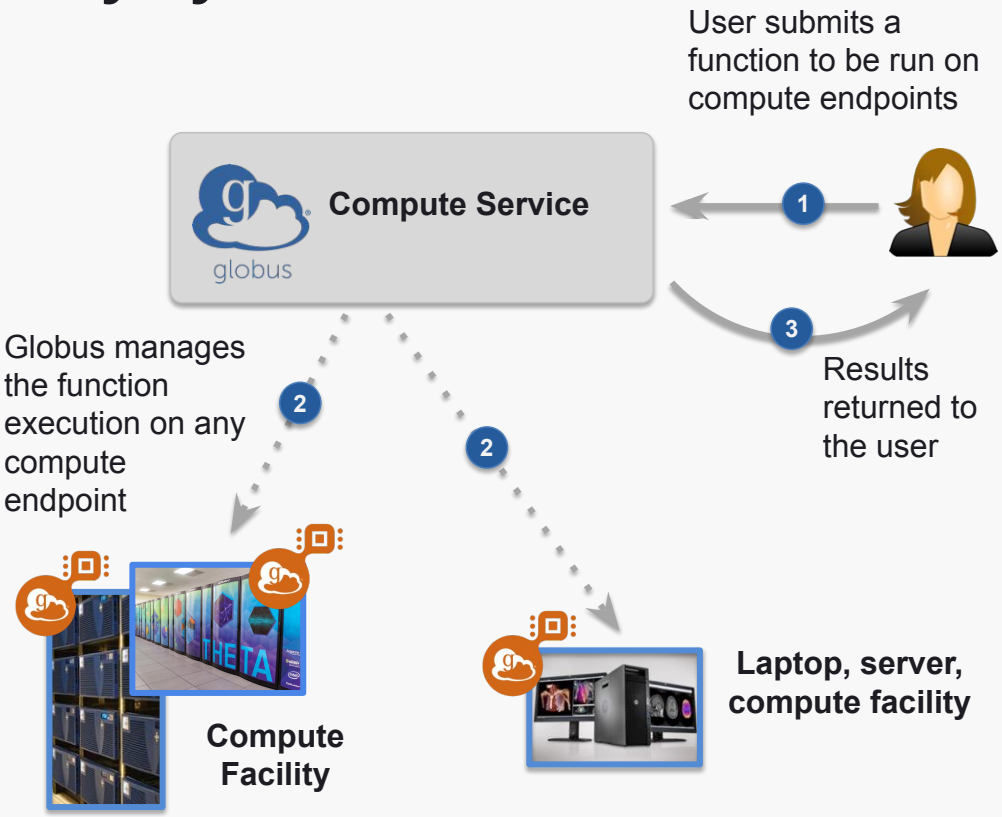
10:30 – 11:00 am

THE UNIVERSITY OF CHICAGO

globus labs

Managed compute …on any system

- **Support use of Python for functions**
- **Fire and forget function execution**
- **Federated authentication, and local access control**
- **Uniform interface to various compute resources**



Globus Compute

FaaS Service + “bring-your-own compute” model

1. Deploy “endpoint” on Cluster or Laptops
2. Define python function for remote execution
3. Submit function to cloud service

```
pip install globus-compute-endpoint
globus-compute-endpoint configure
globus-compute-endpoint start <ENDPOINT_NAME>
export ACADEMY_TUTORIAL_ENDPOINT=<ENDPOINT_ID>
```

Try it!

```
from globus_compute_sdk import Executor

def hello_world():
    return "Hello World!"

tutorial_endpoint_id = '360baa9b-3f74-41d6-8ce1-3c8e64a1231b'
with Executor(endpoint_id=tutorial_endpoint_id) as fxe:
    future = fxe.submit(hello_world)
    print(future.result())
```

Try online: https://jupyter.demo.globus.org/

Launching agents

Goal: Launch agents on remote computers

- Academy supports various methods of deploying agents
  - Manual: `Runtime.run_until_complete()`
  - Thread/Processes: local deployment
  - Parsl: scalable deployment on HPC systems
  - Globus Compute: distributed and scalable deployment on arbitrary systems

Distributing Agents

Goal: Run and Communicate with Agents in the Cloud

- Use `HttpExchangeFactory` for communication

```
HttpExchangeFactory(
    url='https://exchange.academy-agents.org',
    auth_method='globus'
)
```

- Use `GlobusComputeExecutor` for launching

```
GlobusComputeExecutor('<YOUR_ENDPOINT_ID>')
```

Questions?

Up next → Hands-on: Battleship

Academy

Hands-on: Battleship

11:00 – 11:30 am

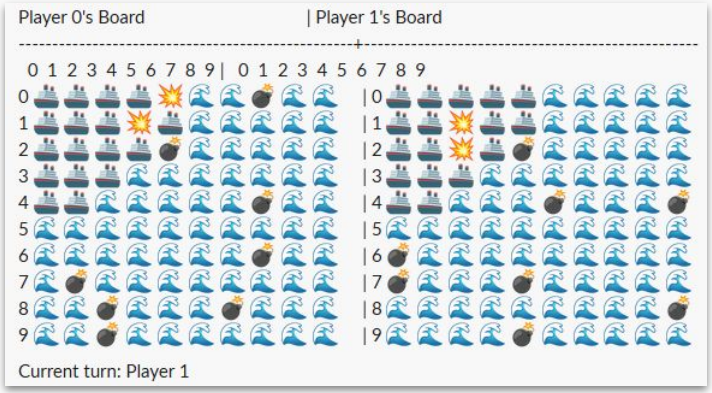
Example: Battleship (30 Minutes)

Battleship Rules:

- 10 x 10 grid of coordinates
- Each player has 5 “ships”
  a. A ship is a continuous run of coordinates
- To start each game, a player places ships on grid
- On each turn:
  a. Guess coordinate on opponents grid
  b. Recieve if guess was a hit or miss

Example: Battleship (30 Minutes)

1. Open the starter code from the repo.
2. Battleship Data Structures
   - Board
   - Game
3. Understand the `Coordinator` class
   - `game` - Runs a single game between two Player agents
   - `play_games` - Repeatedly plays games between two Players
4. Implement BattleshipPlayer
   - get_move - Choose coordinates of next attack
   - new_game - Place ships on new board



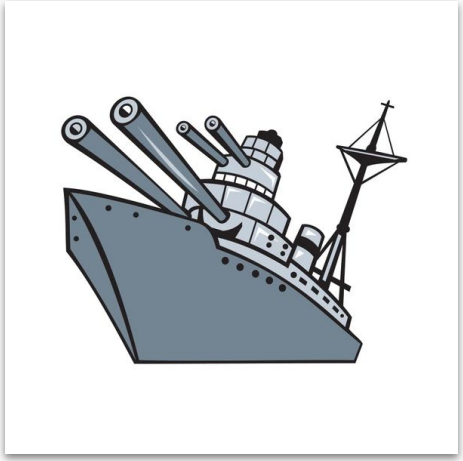
Battleship Extensions

Strategy Ideas:

- Guess in Clusters or in Rows based on hits/misses
- Keep track of opponents previous guesses to place ships next time
- Query LLM for next move?
  - How good is ChatGPT at War Games…

Let the games begin!

- To enter the tournament
  - Share the agent with Globus Groups
  - Register your agent (code below)
- Rules
  - Round-Robin Tournament
  - 0.25 Second Timeout on Moves (with communication)
  - 50 move limit on games



Battleship Tournament Entry Instructions

- Join the “IPDPS-Academy-Tutorial” Globus Group
- Paste your agent into `solutions/05-battleship/enter_tournament.py`
- Set environment variables and run:

```
source ipdps.env
python enter_tournament.py -n “Your Name”
```

- Sharing Agents on the Hosted Exchange

```
factory = HttpExchangeFactory(...)
console = await factory.console()
await console.share_agent(<agent_id>, <globus_group_id>)
```

Academy

Demo: What's Next

11:30 – 11:45 am

Dashboard

How do you monitor and interact with remote agents?

- Monitoring and observability through `academy-dashboard`

```
$ pip install academy-dashboard
```

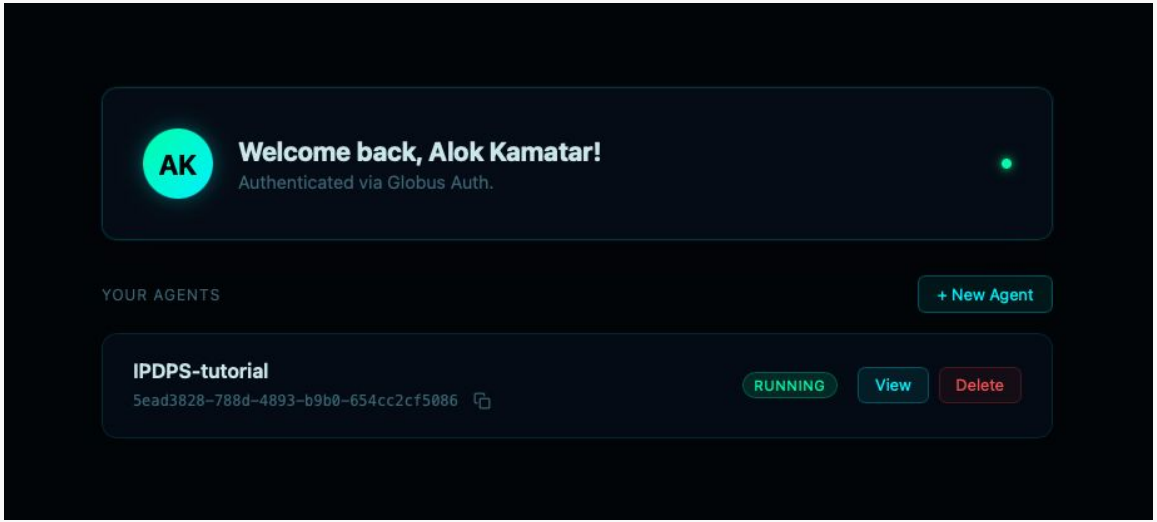
- Locally hosted or service based solution

https://dashboard.academy-agents.org

Upcoming Features: Javascript agents, More control features

Demo: Dashboard

Linked to the hosted exchange or local exchange



Observability structured as `Agents`

Monitored Agent

```
$ pip install academy-dashboard
```

MonitoredAgent sends logs back to UserAgent

Can query UserAgent before performing a task

```python
import asyncio
from academy_dashboard import MonitoredAgent

class Example(MonitoredAgent):
    def __init__(self, user_agent) -> None:
        super().__init__(user_agent_handle=user_agent)

    @action
    async def unsafe_action(self) -> None:
        await self.user_agent.prompt_user(
            ...
        )
```

Academy

Wrap up

11:45 – 12:00 pm

What's Next for Academy?

- Community and Governance
  - Build an engaged, cross-disciplinary community of researchers and developers
  - Establish a sustainable governance and contribution model
- Scientific Engagement
  - Collaborate with domain science teams to evaluate efficacy, identify challenges, and uncover new opportunities for agents in practice
- Ecosystem Integration
  - Connect with the broader agent, AI, and scientific cyberinfrastructure ecosystem
- Technical Directions
  - Develop a secure, scalable, and robust managed exchange for the agent community
  - Enable integrated tool-calling and remote application execution
  - Strengthen provenance, auditability, and reproducibility across agentic workflows

Discussion

- How are you currently using (or planning to use) agents in your work or research infrastructure?
- What makes scientific and cyberinfrastructure contexts uniquely challenging or interesting for agentic systems?
- What are the key capabilities agents need to effectively support scientific workflows (e.g., reasoning, coordination, adaptation)?
- What challenges have you faced (or anticipate) in deploying, managing, or trusting agents across distributed systems?
- How can we promote interoperability and shared frameworks for agents across institutions and domains?
- What new opportunities could agentic systems enable for scientific discovery or collaboration?

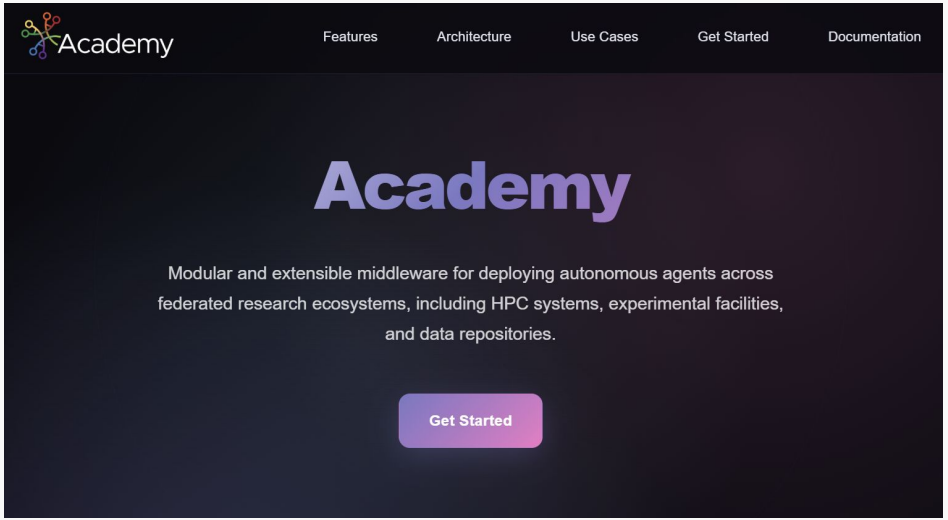
Get Engaged

Try it out / star Academy on github / open issues / contribute to the open source project

Read the paper

Join the community / let us know how you are using Academy

Join the open community meeting Wednesday 1pm CT



Questions?

Academy

Thanks for attending!

Meet the Academy team


Greg **Pauloski**


Alok **Kamatar**


Yadu **Babuji**


Ryan **Chard**


Mansi **Sakarvadia**


Ben **Clifford**


Kyle **Chard**


Ian **Foster**

Learn More

- ➔ Website: academy-agents.org
- ➔ Docs: docs.academy-agents.org
- ➔ Paper: arxiv.org/abs/2505.05428v2

Reach Out

- “Community” linked in website footer
- github.com/academy-agents
- chard@uchicago.edu

Get Started

$ pip install academy-py

academy-agents.org

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