



# Biolmage.IO Chatbot

<https://github.com/bioimage-io/bioimageio-chatbot>

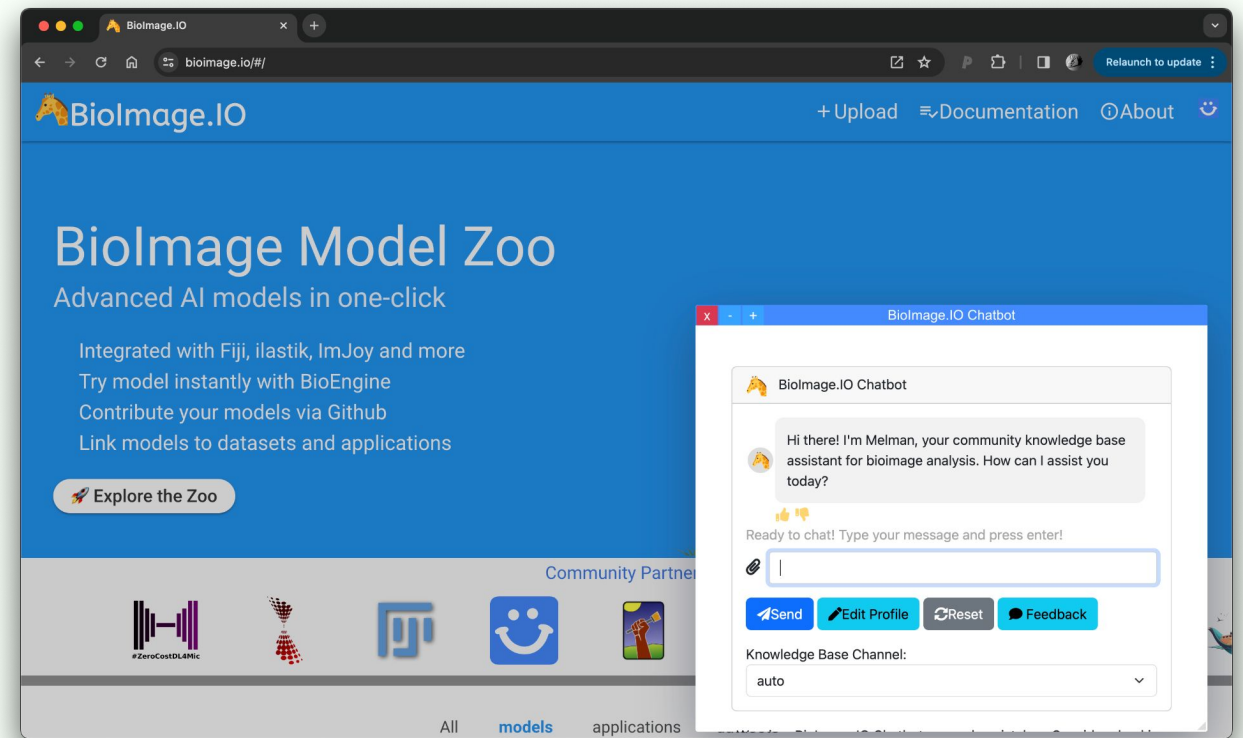
# Biolmage.IO Chatbot: A Community-Driven AI Assistant for Integrative Computational Bioimaging

Wanlu Lei, **Caterina Fuster-Barceló**, Gabriel Reder, Arrate Muñoz-Barrutia  
and Wei Ouyang

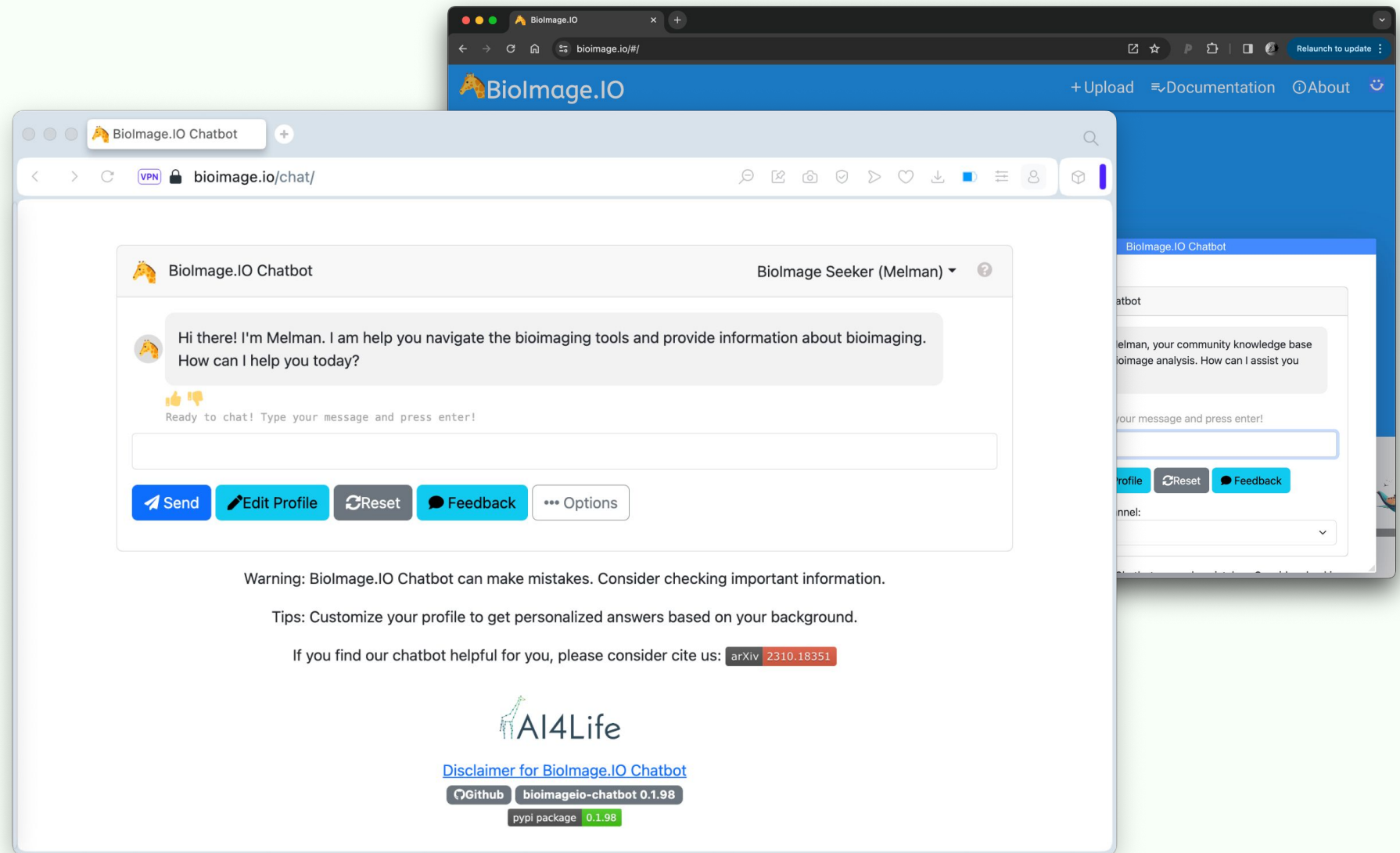


<https://doi.org/10.48550/arXiv.2310.18351>

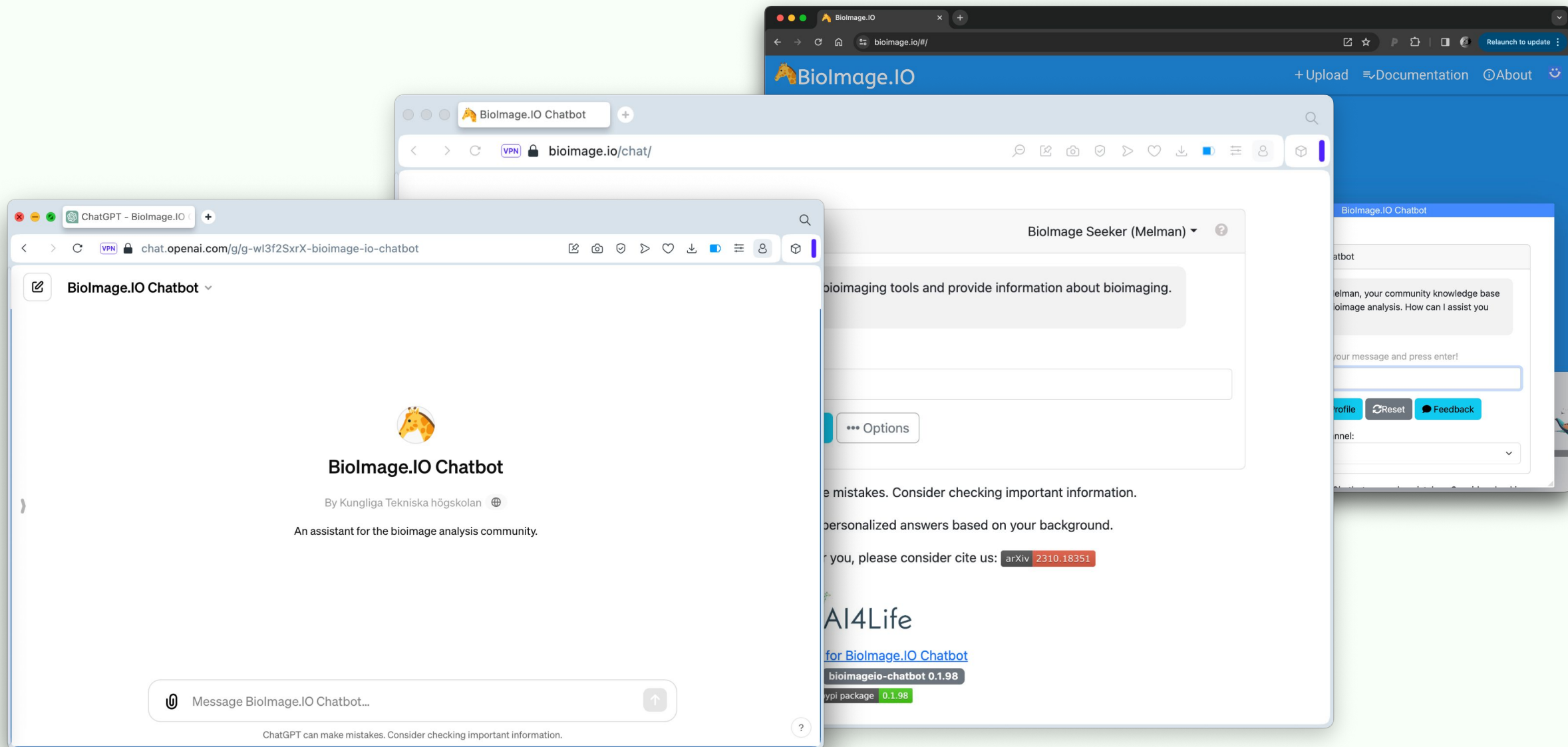
# How can you access it?



## Integrated Chat Assistant



## Standard Alone Chat Assistant



## Custom ChatGPT Assistant

# What can you (a user) do with it?

# Biolmage.IO ChatBot Assistants

## Biolmage Seeker (Melman)

An assistant specializing in searching through **bioimage analysis tools**, including the Biolmage Model Zoo, the Biolmage Archive, biii.eu, and others, to provide **comprehensive support** in bioimaging.

## Biolmage Tutor (Nina)

Your tutor for **learning about bioimage analysis and AI**. Nina is the perfect guide, offering detailed explanations and support throughout your learning journey.

## Biolmage Analyst (Bridget)

Offers tools to **analyze your images directly** or helps you construct a Python pipeline for advanced image processing tasks.

## Biolmage GPT (Skyler)

Facilitates the **integration of bioimaging tools and workflows**, making it easier to apply advanced analysis techniques in your research



# It's demo time!

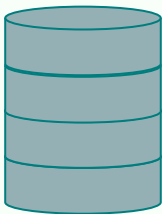
<https://bioimage.io/chat/>

# How do we do it?

RAG (Retrieved Augmented Generation)  
FAISS (Facebook AI Similarity Search)

# Community Knowledge Base

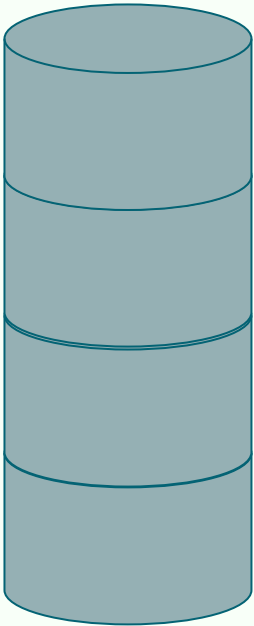
## Documentation Retrieval and Ingestion



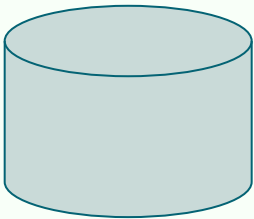
Retrieve Documentation

Embedding Model (OpenAI)

Document embeddings

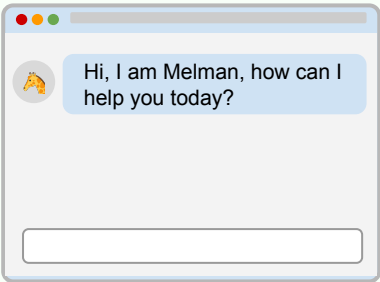
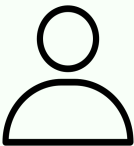


VectorDB FAISS



Knowledge base on S3 storage

## User query and response generation



Query and embedded query

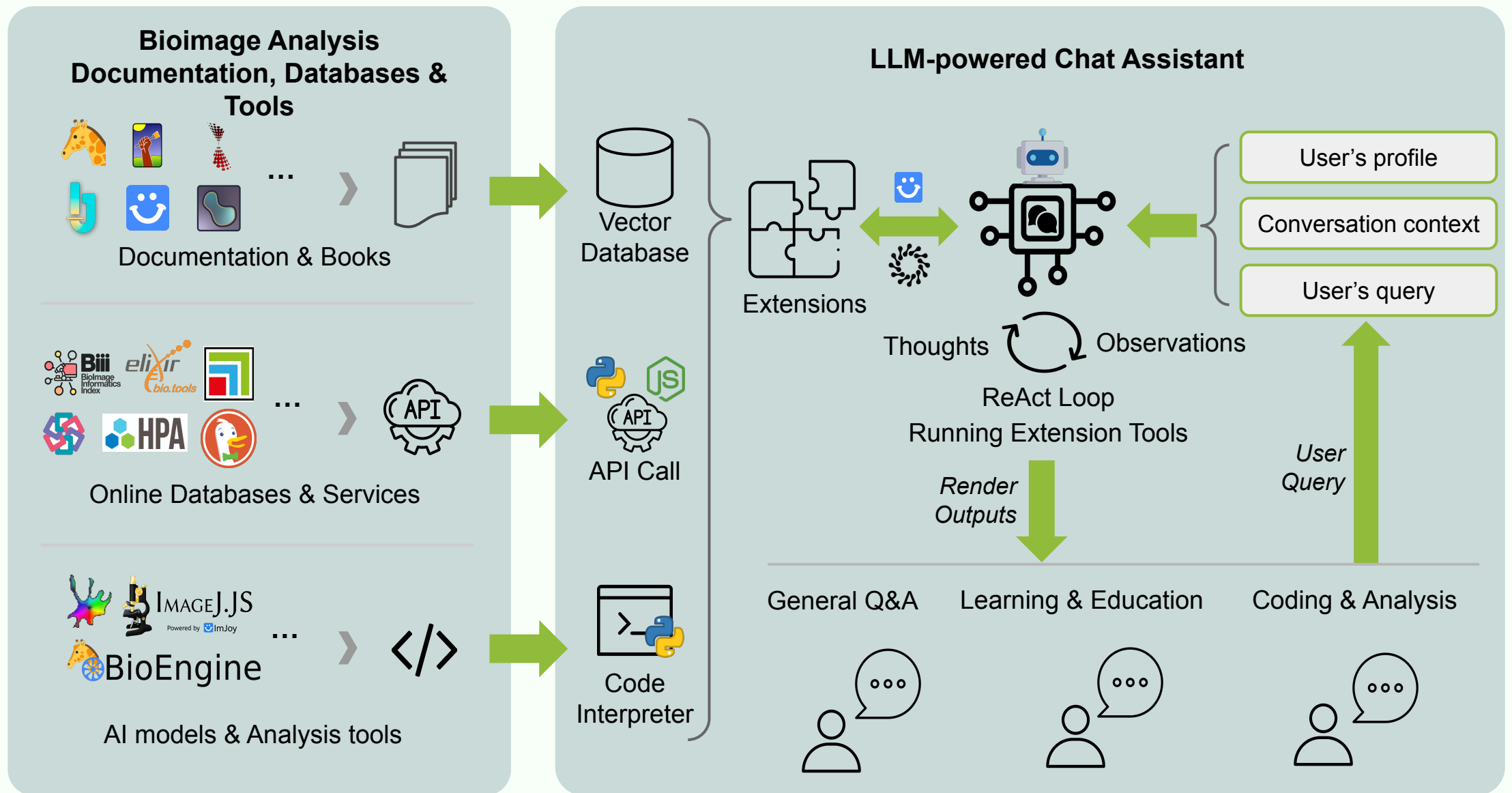
Prompt + query + enhanced context

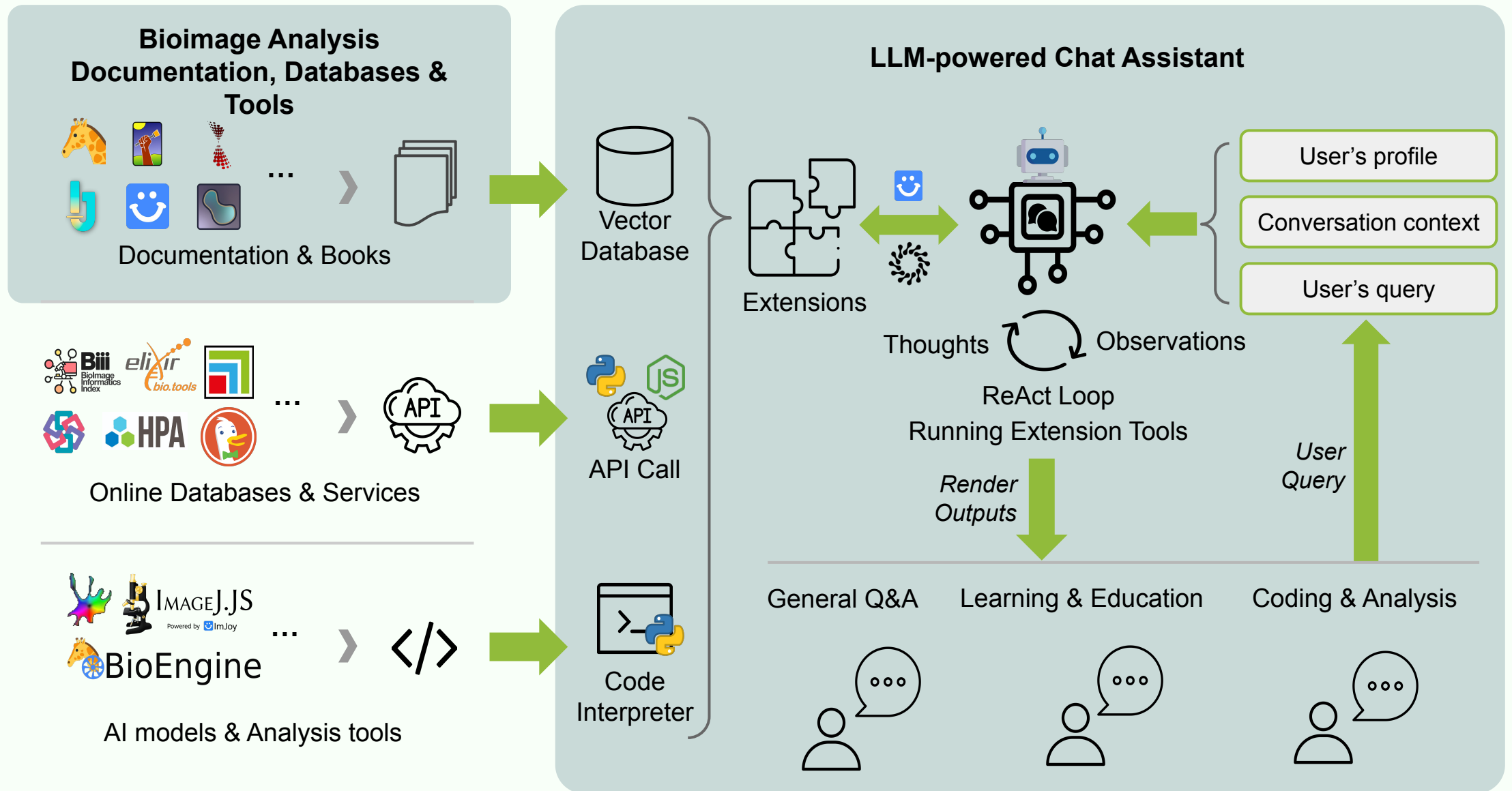
LLM (OpenAI)



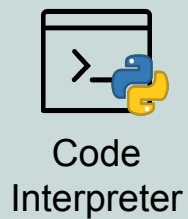
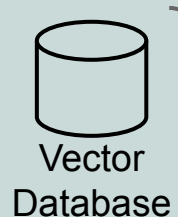
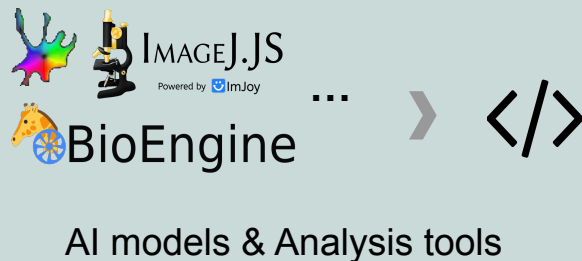
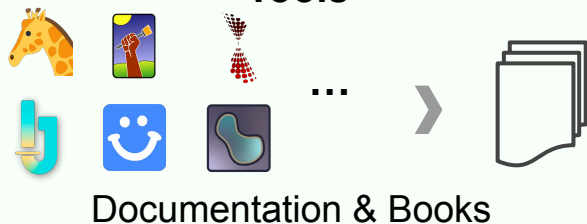
ReAct Loop

Streamed text response

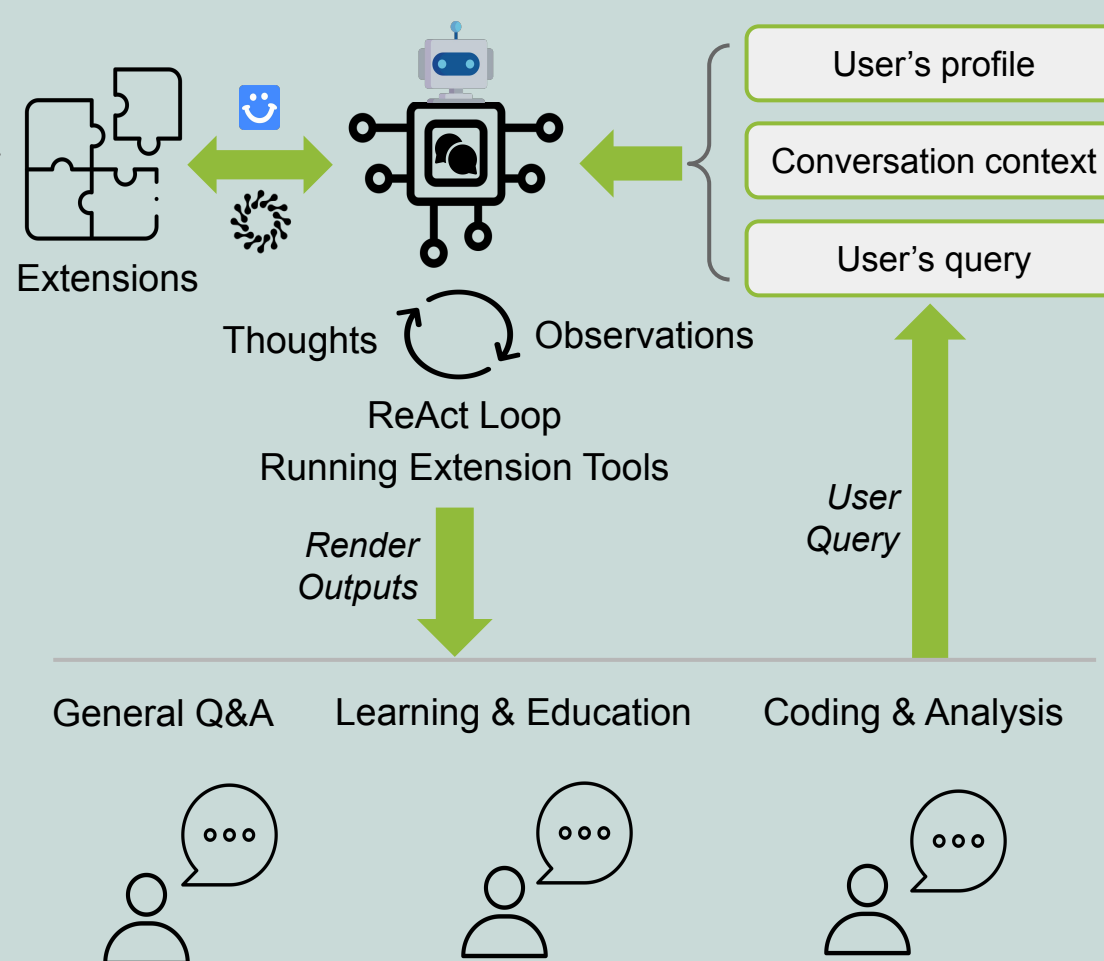




## Bioimage Analysis Documentation, Databases & Tools



## LLM-powered Chat Assistant



**a Searching in Documentation**

What are the best practices for improving model discoverability in bioimage.io?

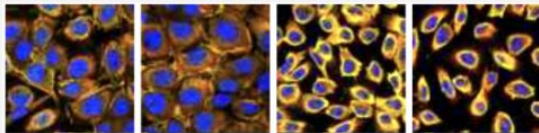
To optimize model performance on bioimage.io, focus on using informative tags, a clear model name, and representative cover images to enhance discoverability and user-friendliness...



**b Exploring the Human Protein Atlas**

Tell me about PML protein and show me cell images.

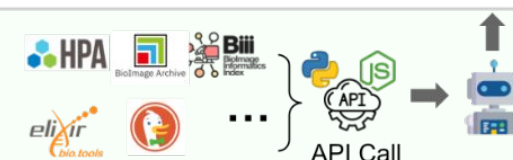
The PML (Promyelocytic Leukemia) protein, also known as MYL, RNF71, or TRIM19, is a nuclear body scaffold protein. It is primarily located in nuclear bodies and is involved in various biological processes... Here are some cell images.



**c Querying the BioImage Archive**

Please find dataset with cell Images at G1 phase

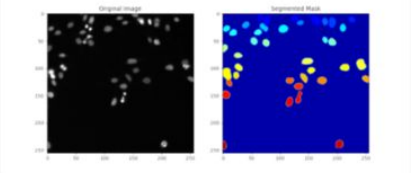
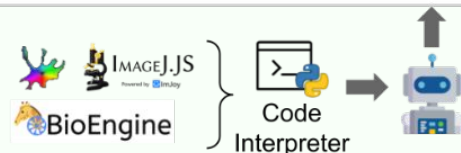
I found a dataset titled "mRNA of the G1/S repressor WHI5 is found at similar levels throughout the cell cycle" that might be relevant to your search for cell images at the G1 phase... [Access the study.](#)



**d Running AI Models for Image Analysis**

Segment the image `/mnt/nuclei.tif` using Cellpose

I've successfully run the Cellpose model on your image using the BioEngine service. Here's the result showing both the original image and the segmented mask:

**e Developing New Extensions**

BioImage.IO Chatbot Service Extensions

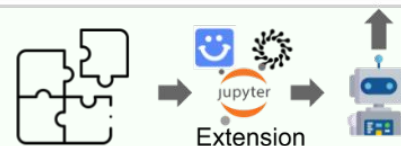
```
from imjoy import api

async def setup():
    chatbot = await api.createWindow(src="https://bioimage.io/chat")
    await chatbot.registerExtension(chatbot_extension)

api.export({"setup": setup})
```

Please move to the center and snap an image

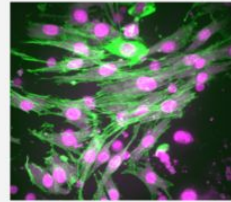
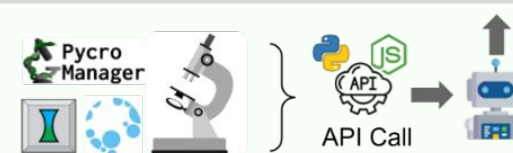
The stage was successfully moved the center, and an image was taken:



**f Controlling Microscopes via Extensions**


Please move to the center and snap an image


The stage was successfully moved the center, and an image was taken:







# Example: Chatbot extension for Controlling Microscopes





 Biolmage.IO Chatbot

 Hi there! I'm Melman, your community knowledge base assistant for bioimage analysis. How can I assist you today?



Ready to chat! Type your message and press enter!

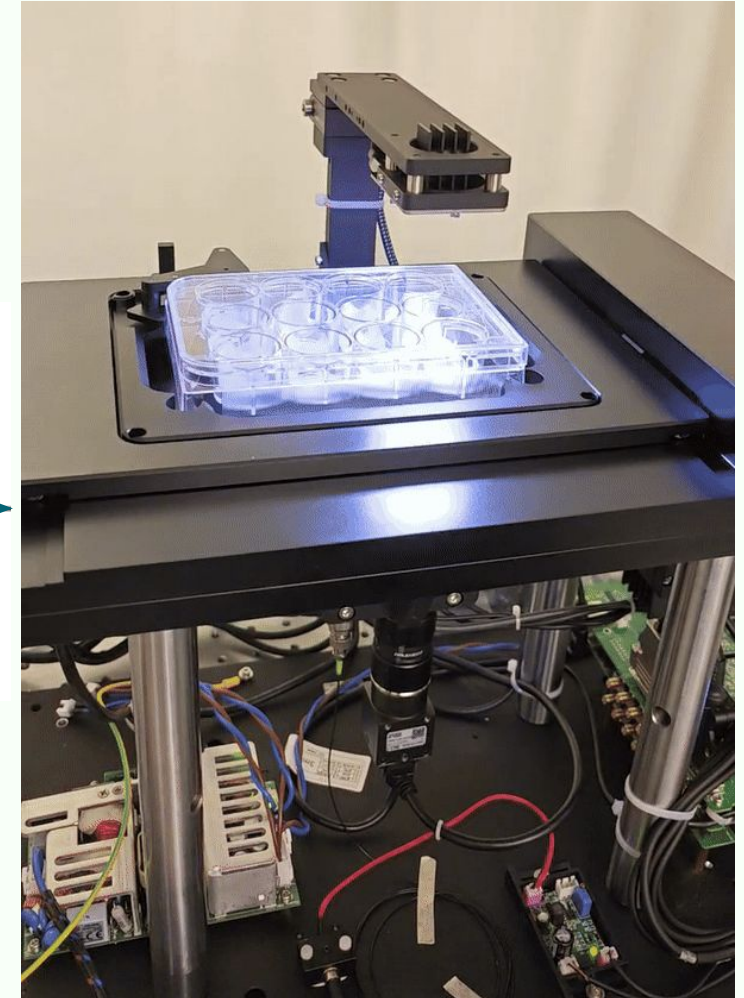
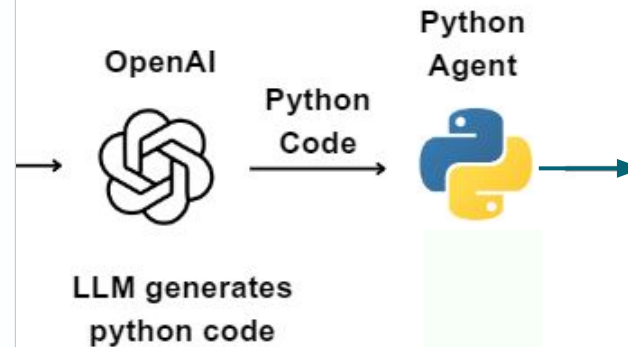
Hi, please move 5000,0,0 along the X, Y, and Z axis and take a picture. Then move back and snap a picture.

Knowledge Base Channel:

auto

Tips: Customize your profile to get personalized answers based on your background.





# How can you contribute?

# Contributing to the BioImage.IO Chatbot



**Developing Extensions**



**Adding Tool  
Documentation**



**Feedback and User  
Experience**

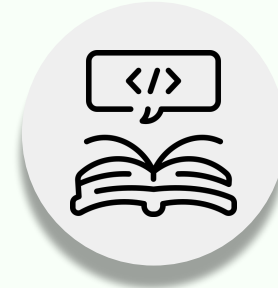


**Direct Contribution to the  
GitHub project**

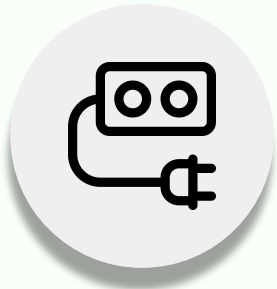
# Our Claims



By using **RAG** we ensure that the chatbot's information comes from **reputable sources** and **avoid hallucinations**, between others



Even though we've used proprietary LLMs from OpenAI, we maintain an **adaptable system architecture** for future transition to **open-source LLMs**



The **extension-based design** empowers the **bioimaging community** to directly drive the chatbot's enhancement and development



By inviting contributions, we leverage the collective intelligence of the community to foster the **chatbot's continuous evolution**





Biolmage.IO Chatbot

Biolmage Seeker (Melman) ▾



Hi there! I'm Melman. I am help you navigate the bioimaging tools and provide information about bioimaging. How can I help you today?



Ready to chat! Type your message and press enter!

A

Send

Edit Profile

Reset

Feedback

Options

Warning: Biolmage.IO Chatbot can make mistakes. Consider checking important information.

Tips: Customize your profile to get personalized answers based on your background.

If you find our chatbot helpful for you, please consider cite us: [arXiv 2310.18351](#)



[Disclaimer for Biolmage.IO Chatbot](#)

Github

bioimageio-chatbot 0.1.97

pypi package 0.1.97


Biolmage.IO Chatbot

bioimage.io/chat/?assistant=Bridget


New Chrome available

Biolmage.IO Chatbot

Biolmage Analyst (Bridget)



Hi there! I'm Bridget, I can help you with your image analysis tasks. Please mount your data folder and let me know how I can assist you today.



Ready to chat! Type your message and press enter!

Send

Mount Files

Code Interpreter

Edit Profile

Reset


Feedback

Options

Warning: Biolmage.IO Chatbot can make mistakes. Consider checking important information.

Tips: Customize your profile to get personalized answers based on your background.


If you find our chatbot helpful for you, please consider cite us: [arXiv 2310.18351](#)




AI4Life

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AI4Life



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[@AI4LifeTeam](#)