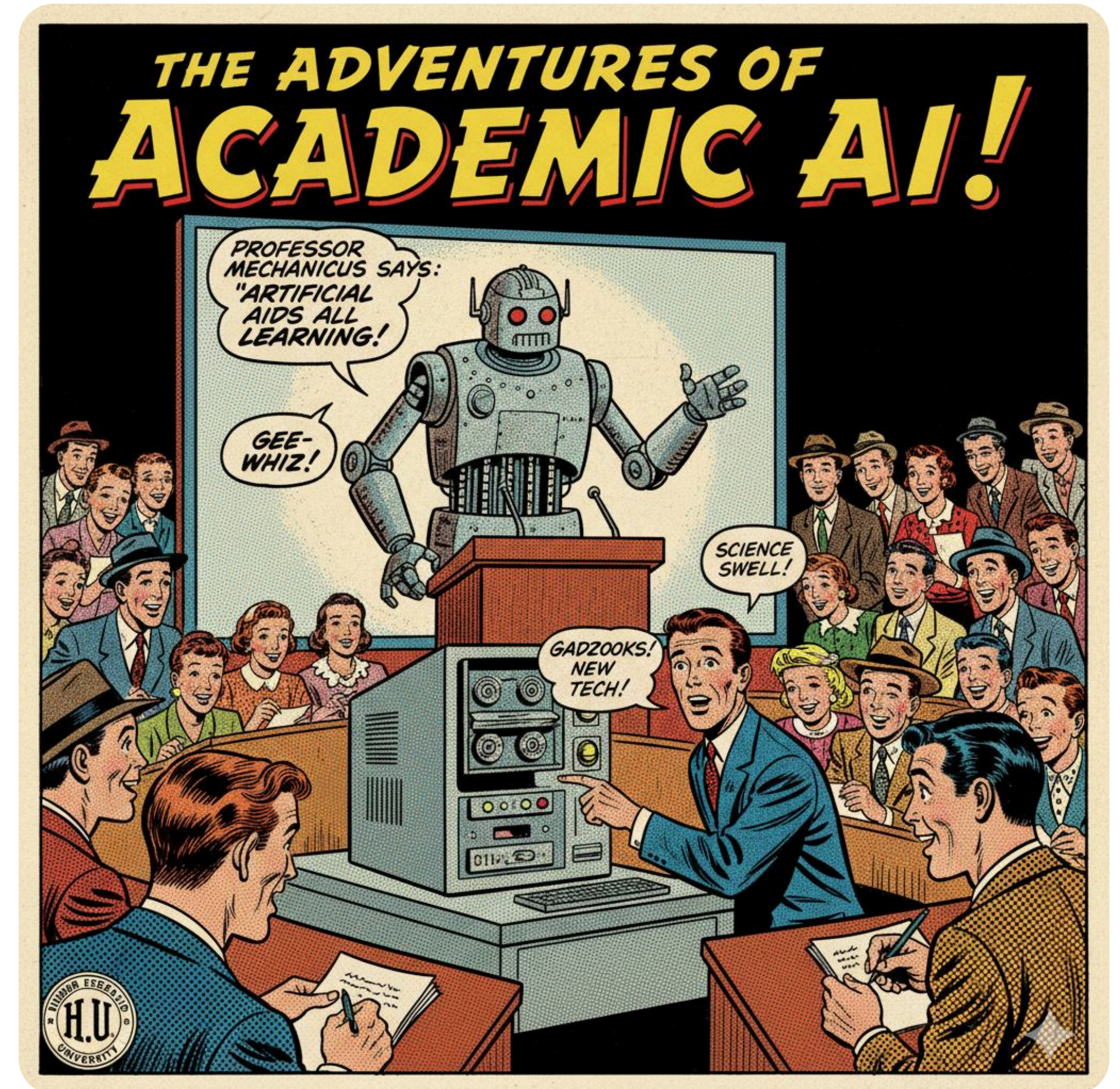


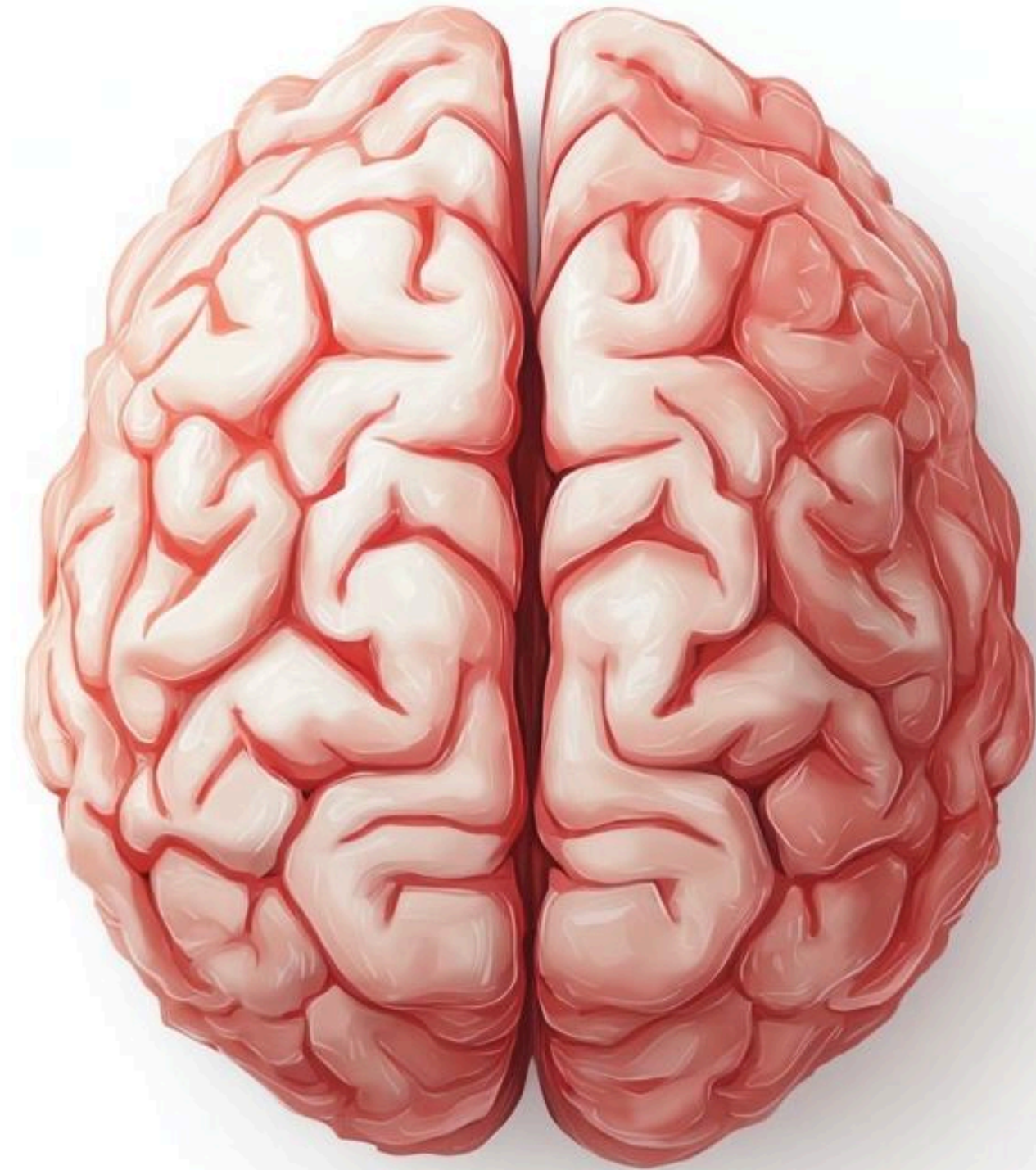
# AI in higher education at FHNW HLS local and sustainable

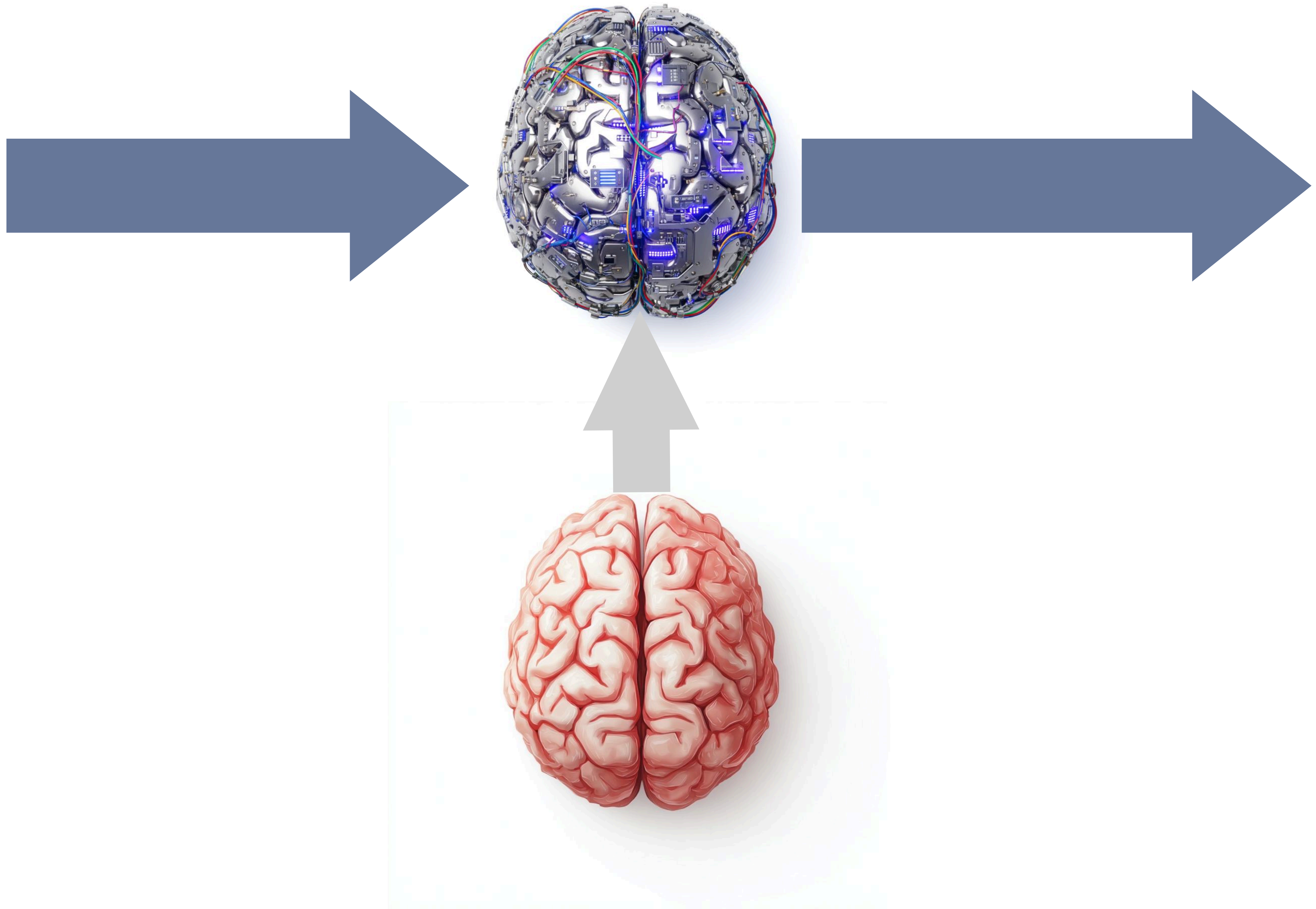
Oliver Mülken and Tilman Schieber

Zentrum für Ausbildung und Lehre / HLS / FHNW

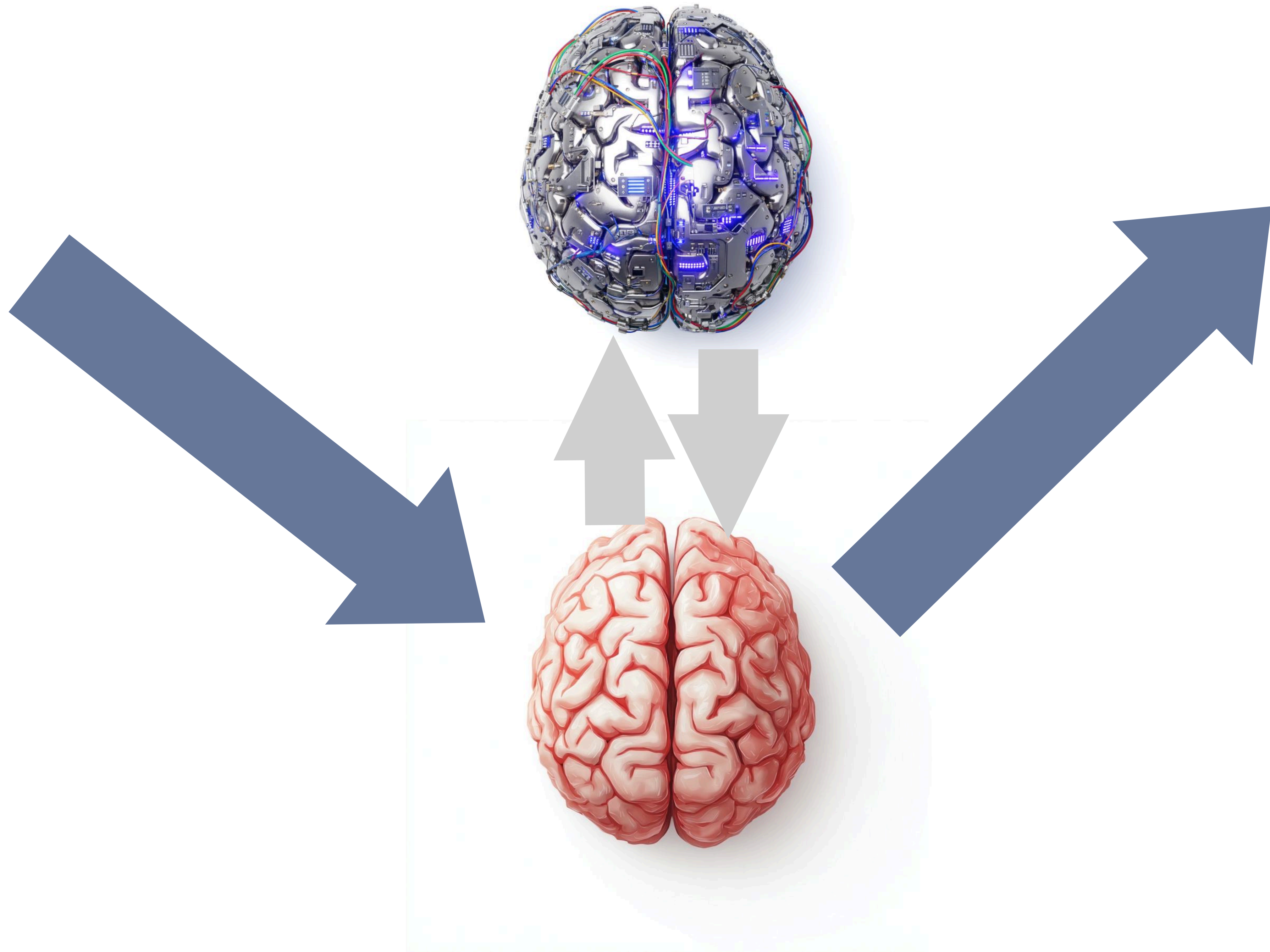


**use your  
natural resource**

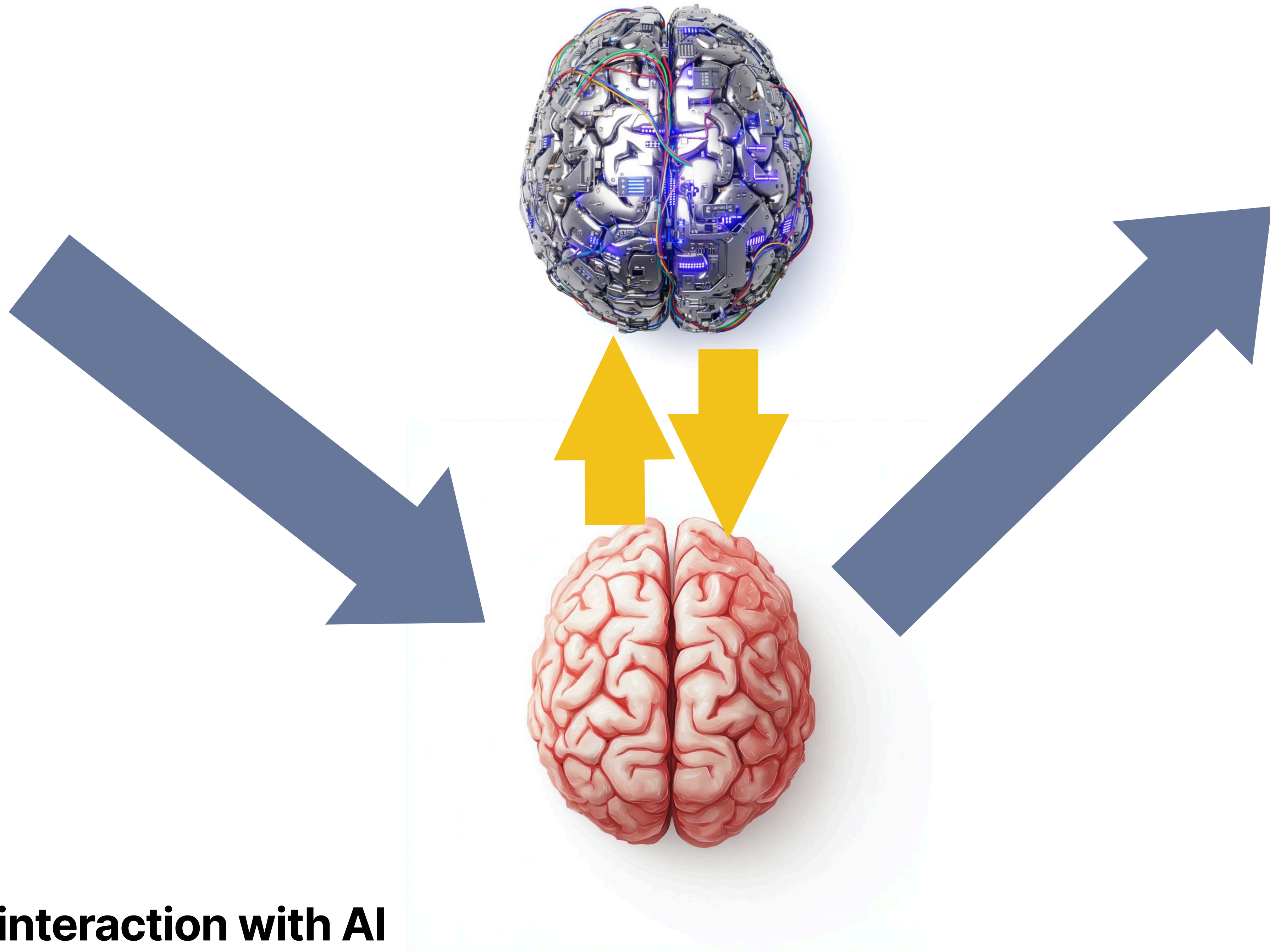




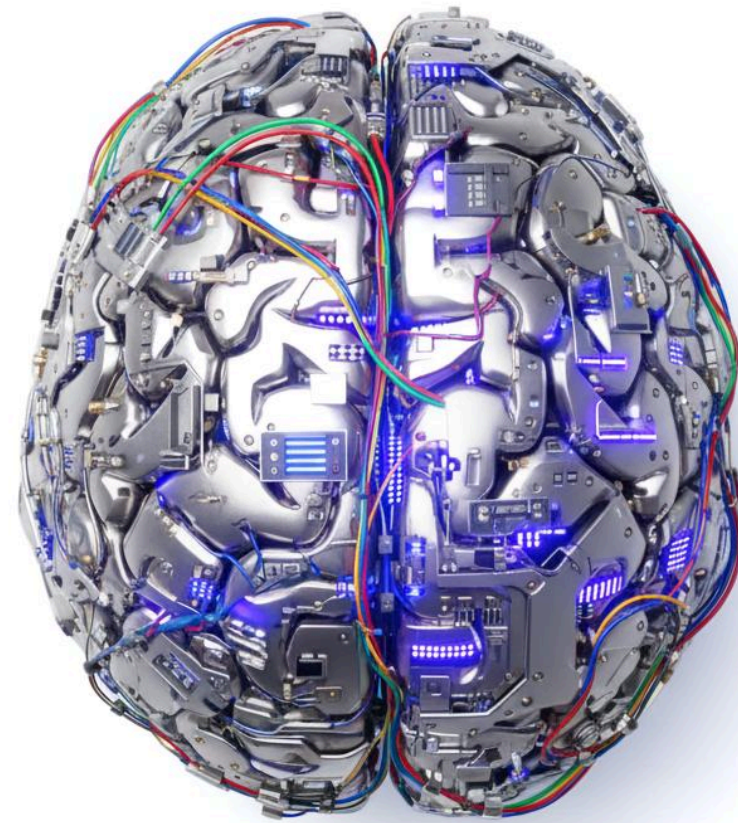
**the fear**



**the hope**

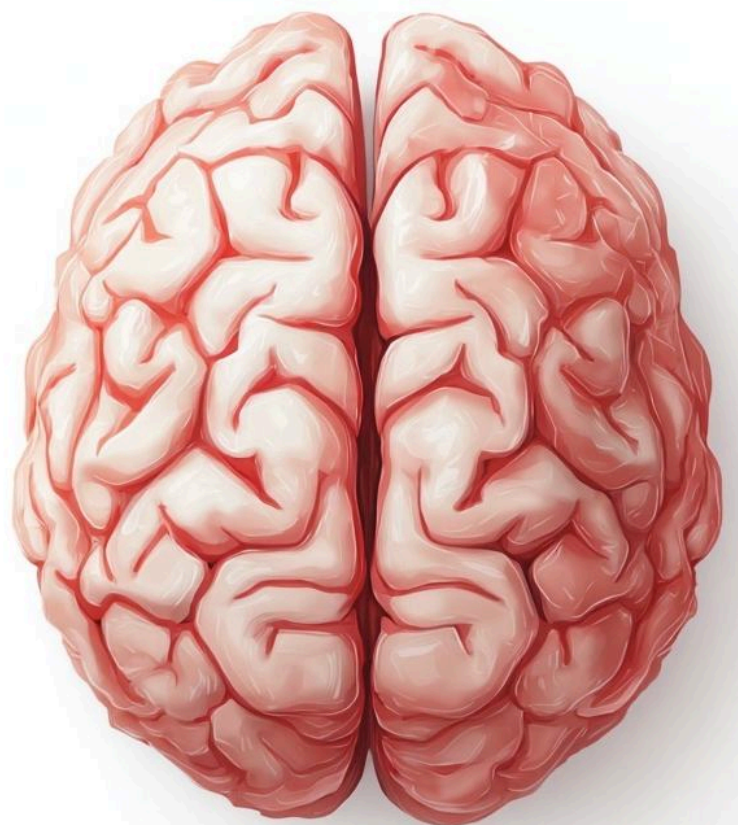


**shape the interaction with AI**



**make AI a  
partner in learning**

**... not a shortcut**



## **AI assistants in learning**

- chemical structural formulas
- conversational english
- basic algebra (yet to be implemented)

## **AI literacy (in Life Sciences)**

- when to use AI tools
- how to use AI tools
- basic “understanding” of AI tools

## **Data protection**

- implement local solutions (HPC cluster / BYOD)
- keep project data privat

# AI assistance in learning

## Chemistry

- sparring partner for learning / memorizing
- basics of Chemistry
- structural formulas

## English

- sparring partner for conversational English
- interactive communication with AI
- continuous feedback on style and grammar

## Algebra (yet to come)

- understanding mathematical formulas
- finding mistakes in calculations
- ping-pong with AI to get to solution

# AI literacy in Life Sciences constructive alignment

## when to use ...

- general text book knowledge
- languages (spoken & programming)
- be careful with math problem solutions! - for the time being ...

## how to use ...

- make AI your sparring partner
- don't just ask for the solution
- be careful with your choice of AI tools!

## basic practical understanding ...

- LLMs are no "eierlegende Wollmilchsau"
- limitations and challenges

# **data protection for future use cases**

## **we offer ...**

- local LLMs installations to keep data local  
HPC server (NVIDIA GPUs)  
BYOD (depending on device)

## **what you can do ...**

- do not use public LLMs with your project data  
(if you do, make sure to anonymize your data)
- make your data easily readable for local LLMs

## **benefit**

- your data stays within the FHNW  
(your device or local server)
- you can use AI tools to analyze your data directly
- peace of mind

# **HLS AI assistants**

## **- the idea**

### **topical AI chat-bot**

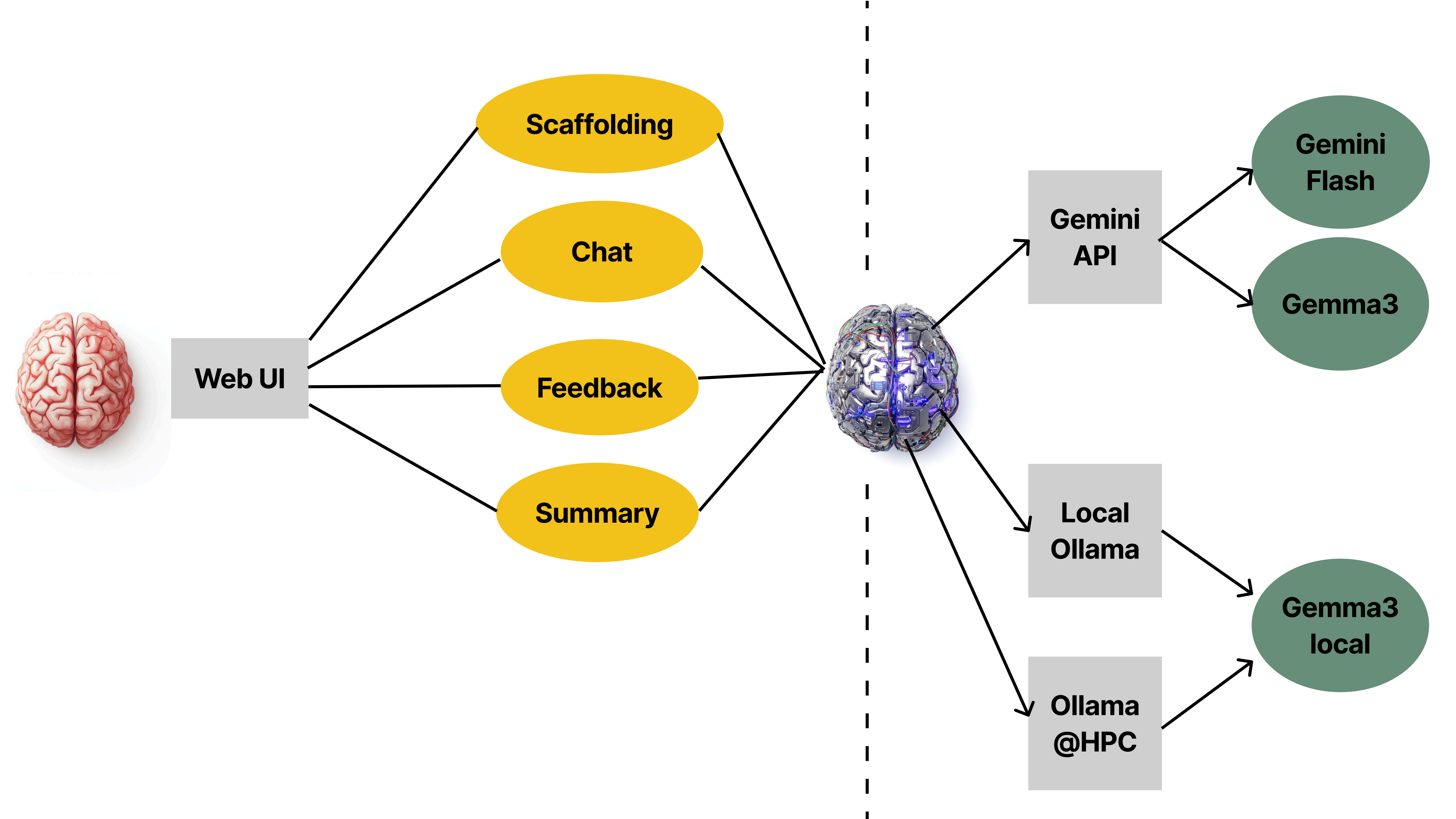
- chemistry
- english language
- basic algebra (yet to come)

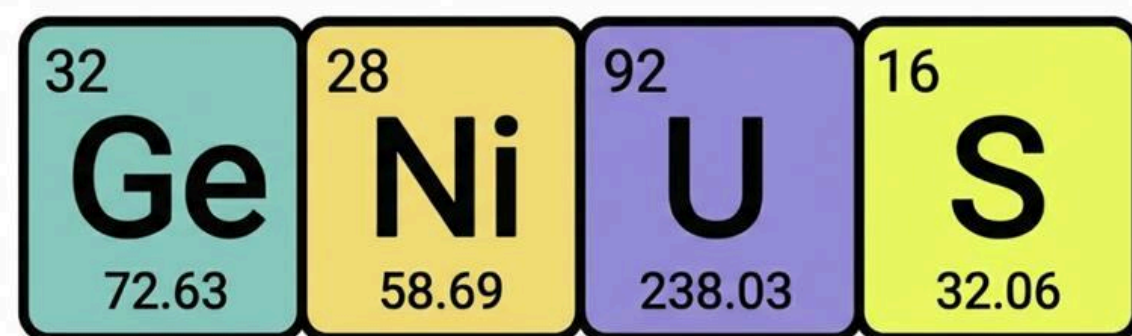
### **continuous AI feedback**

- help on topic
- feedback on answers

### **final AI assisted feedback**

- overall assessment of session
- tips on how to improve





## HLS Chemistry tutor

- students have to solve tasks by interacting with structural formulas
- chemical formulas are transparently converted to editable molecules (using the open source tool ketcher)
- AI gives hints while solving, and a feedback on the solution



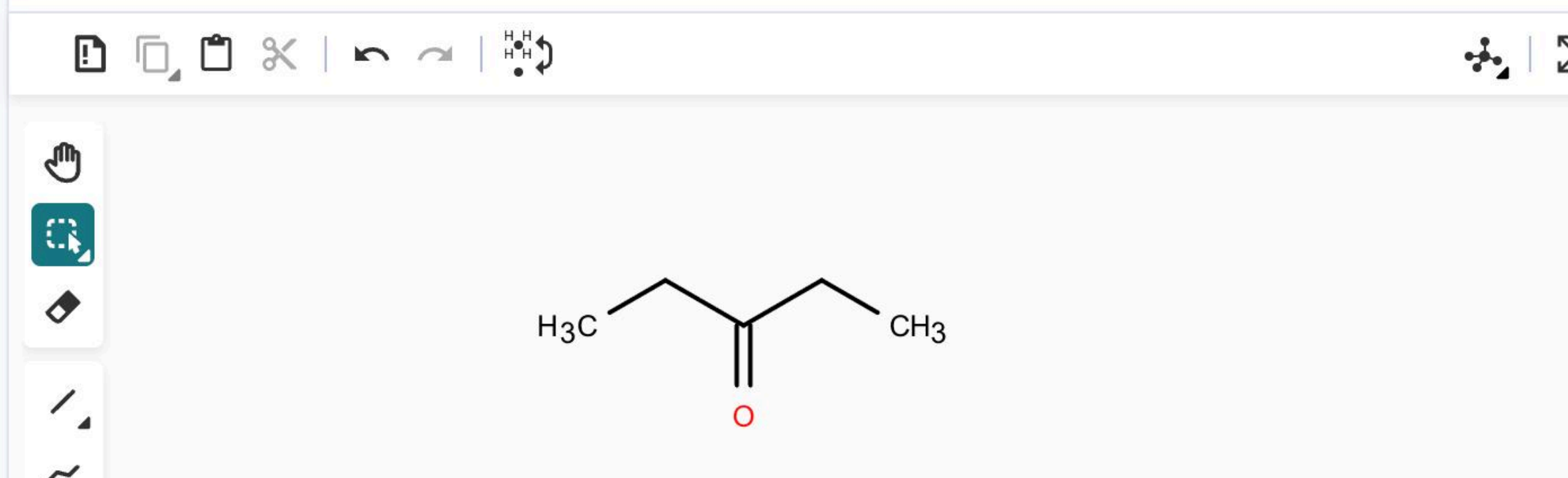
[ge-ni-us.replit.app](https://ge-ni-us.replit.app)

You are starting with the structure of 3-Pentanone. Modify this structure by introducing a primary amine functional group (-NH<sub>2</sub>) at the terminal carbon atom furthest away from the existing carbonyl group. Draw the resulting molecule.

This task requires you to recognize the structure of 3-Pentanone and perform a functional group substitution at a specific position on the carbon chain.

[Submit Answer](#) [Get Hint \(0/3\)](#) [Clear](#)

Structure Editor



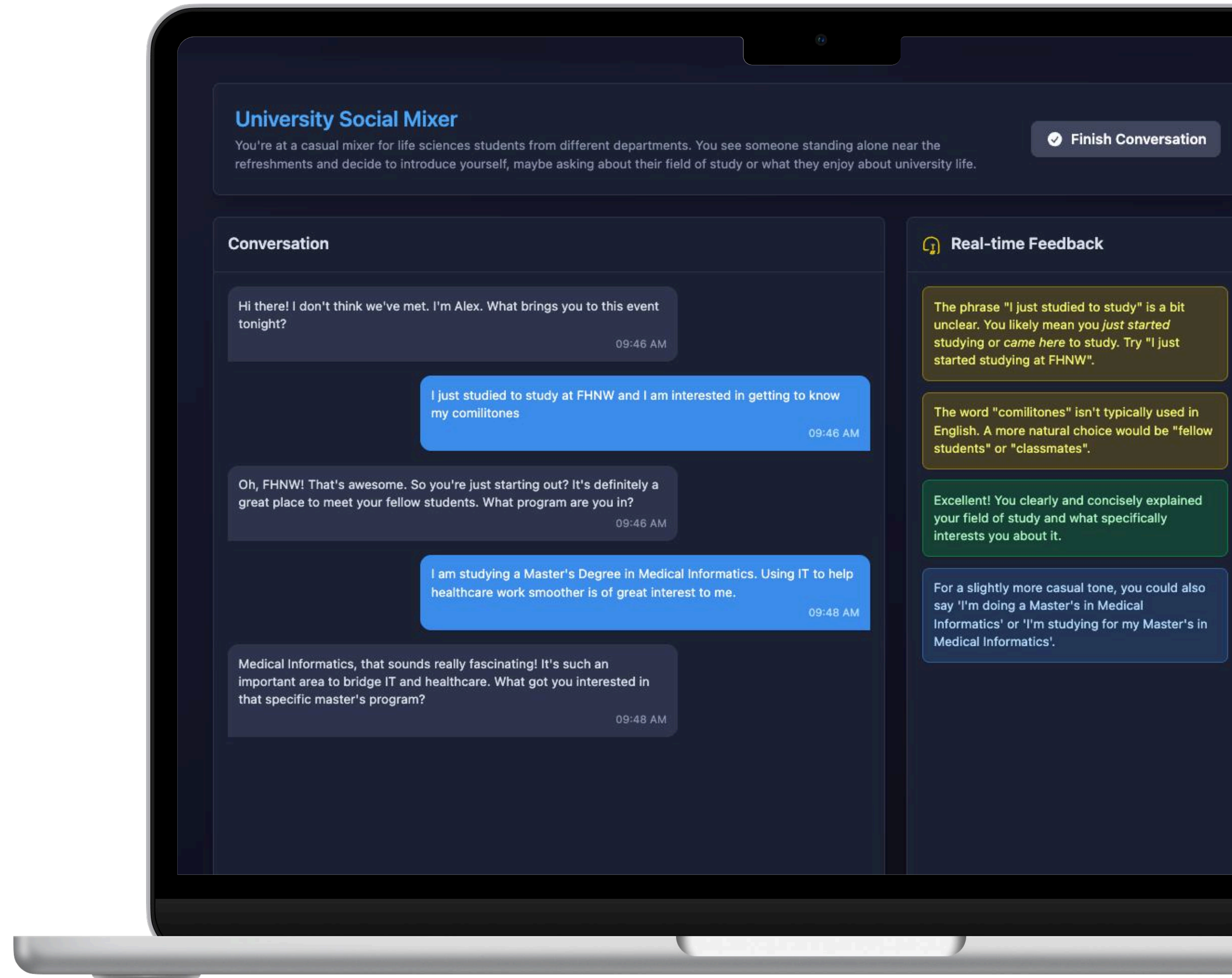
The screenshot shows a web-based chemistry editor interface. At the top, there is a text prompt for a task: 'You are starting with the structure of 3-Pentanone. Modify this structure by introducing a primary amine functional group (-NH<sub>2</sub>) at the terminal carbon atom furthest away from the existing carbonyl group. Draw the resulting molecule.' Below the prompt is a sub-task description: 'This task requires you to recognize the structure of 3-Pentanone and perform a functional group substitution at a specific position on the carbon chain.' There are three buttons: 'Submit Answer' (dark blue), 'Get Hint (0/3)' (teal), and 'Clear' (light grey). Below the buttons is a 'Structure Editor' section. It features a toolbar with icons for file operations (save, copy, paste, delete), editing (undo, redo), and a search icon. A sidebar on the left contains icons for a hand (pan), a magnifying glass (zoom), a pencil (draw), and a selection tool. The main workspace displays the skeletal structure of 3-pentanone, with the carbonyl oxygen atom highlighted in red. The terminal methyl groups are labeled 'H<sub>3</sub>C' and 'CH<sub>3</sub>'.

# Andrew, the HLS English tutor

- chat with the tutor in a variety of conversation scenarios
- continuous AI assessment of grammar (and writing/vocabulary)
- final AI assessment with suggestions on improvements



[ai-ndrew.replit.app](https://ai-ndrew.replit.app)



# Demo



**[ai-ndrew.replit.app](https://ai-ndrew.replit.app)**



**[ge-ni-us.replit.app](https://ge-ni-us.replit.app)**

# AI in higher education at HLS

## HLS funded project

- internal research project 01/25 - 12/25
- budget ca. 50`000 CHF
- local HPC server

## Interdisciplinary approach

team consists of:

- chemist
- computer scientist
- linguists (english)
- mathematician
- musician
- physicists

## Keep it local

Using local solutions to achieve:

- sustainability
- data safety
- integration into curriculum