THE UNIVERSITY OF TEXAS
MD Anderson Cancer Center
Making Cancer History®

Future Perspectives

The University of Texas System

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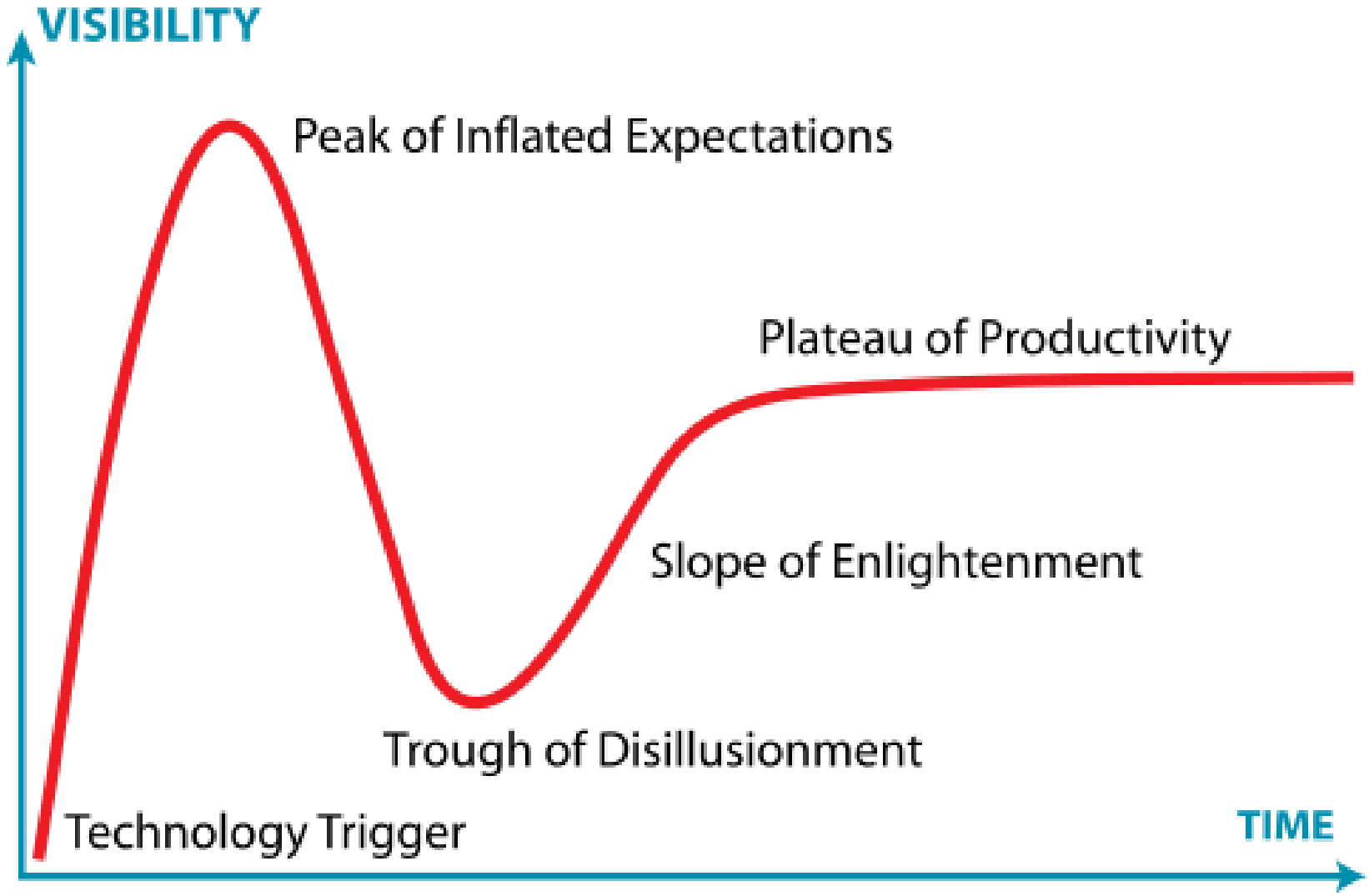
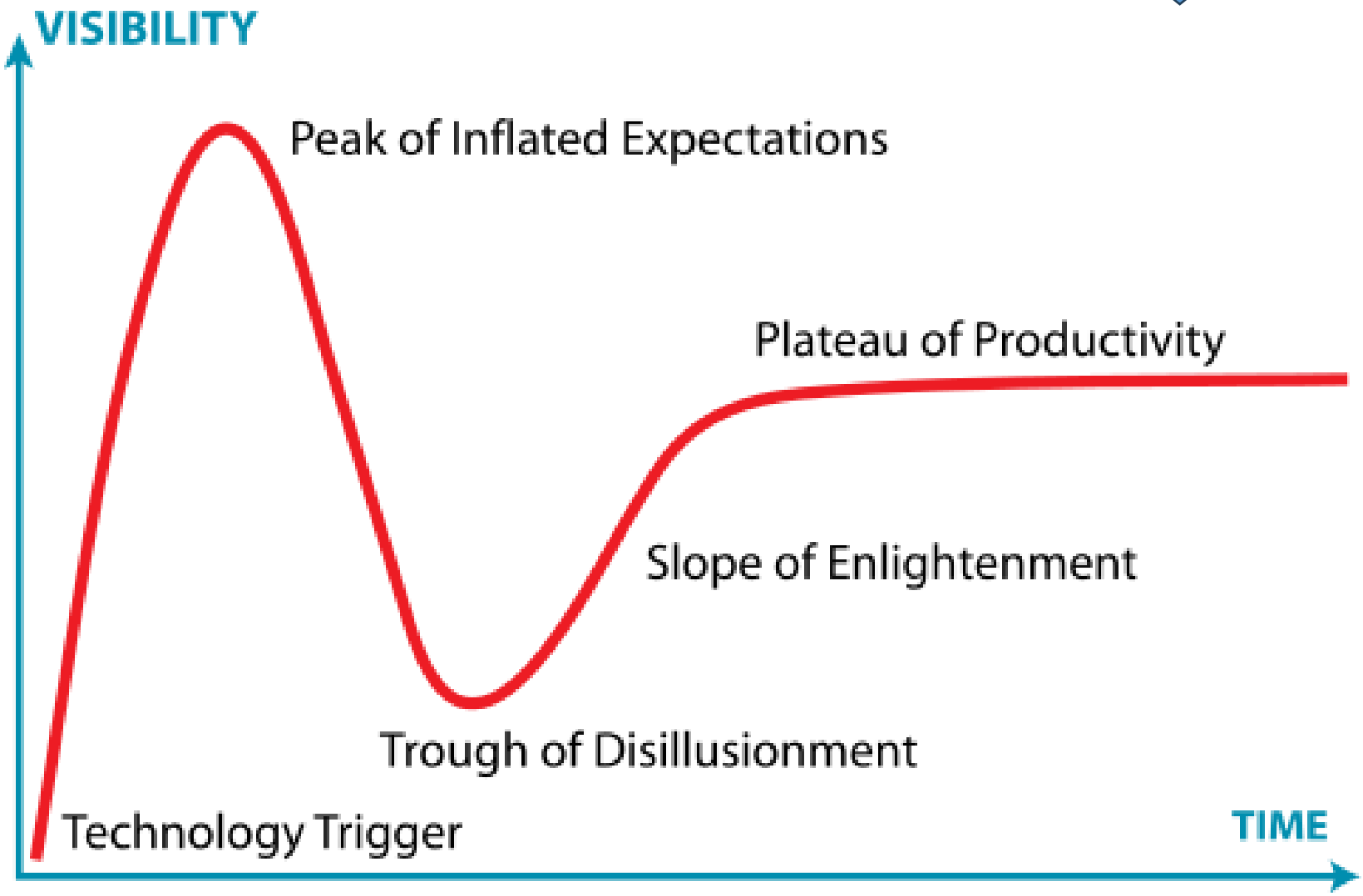
Where are we today? Time for audience participation!



Gartner's hype cycle framework (1995) by analyst Jackie Fenn

We are here.



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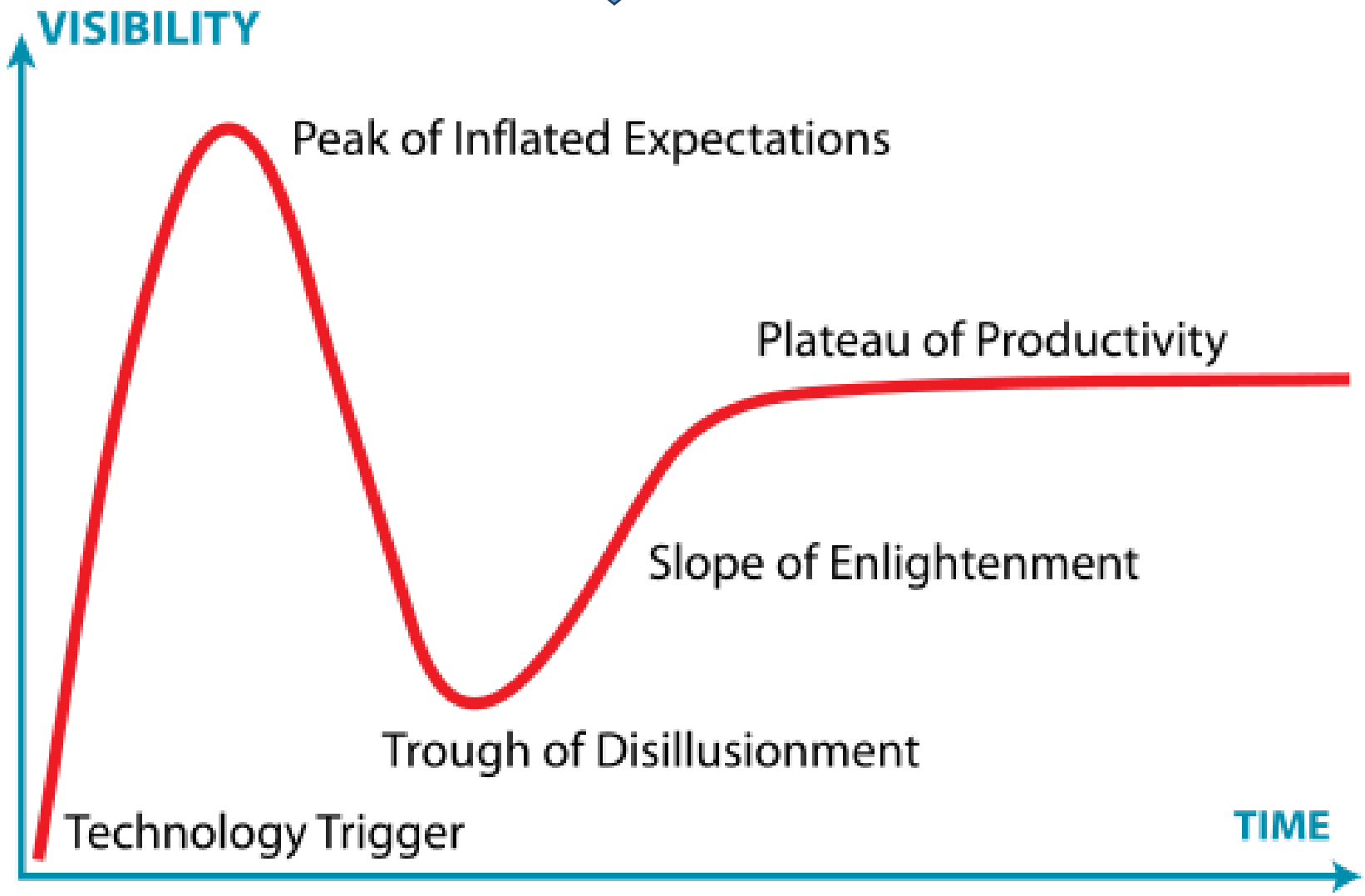

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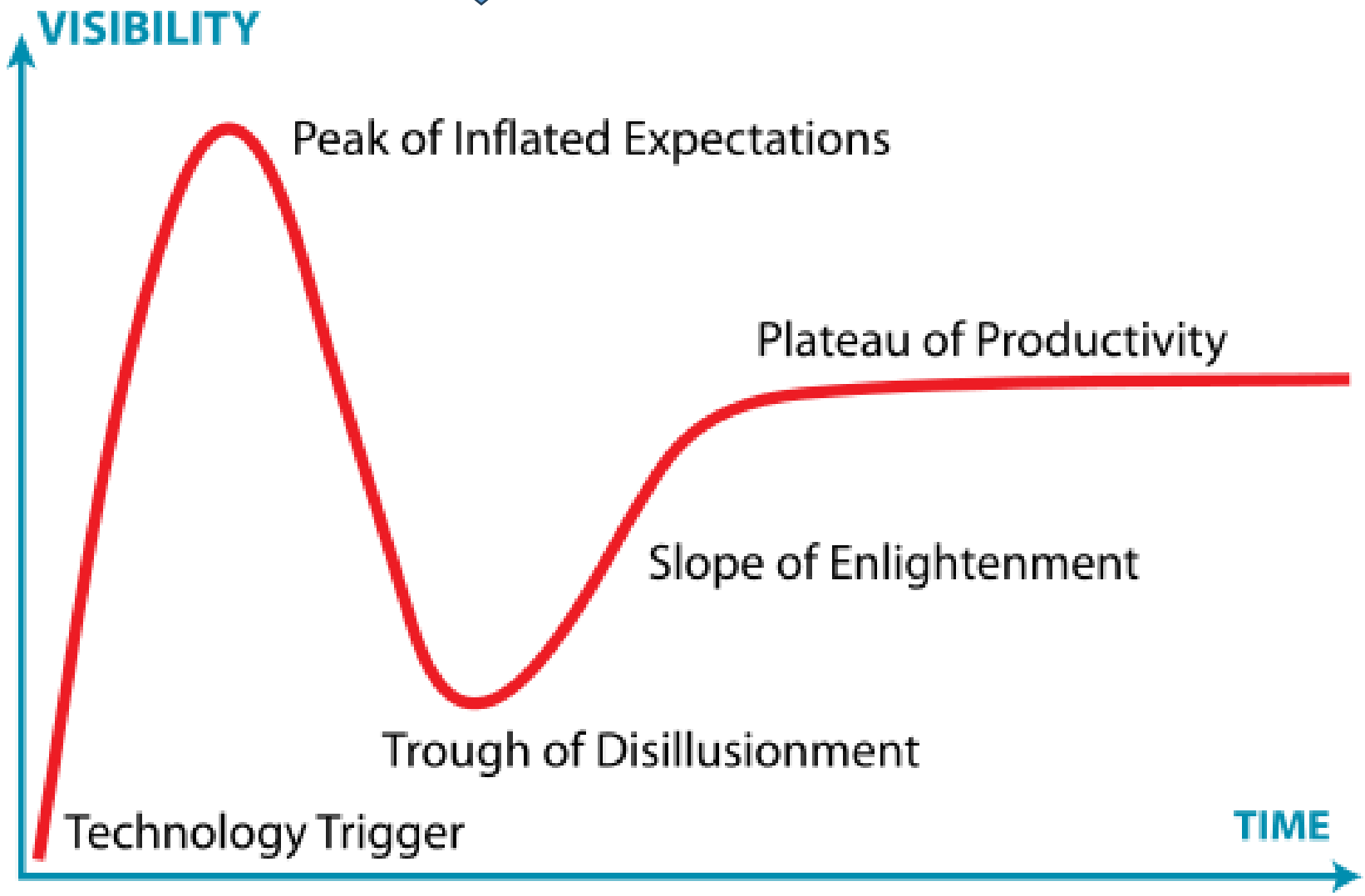

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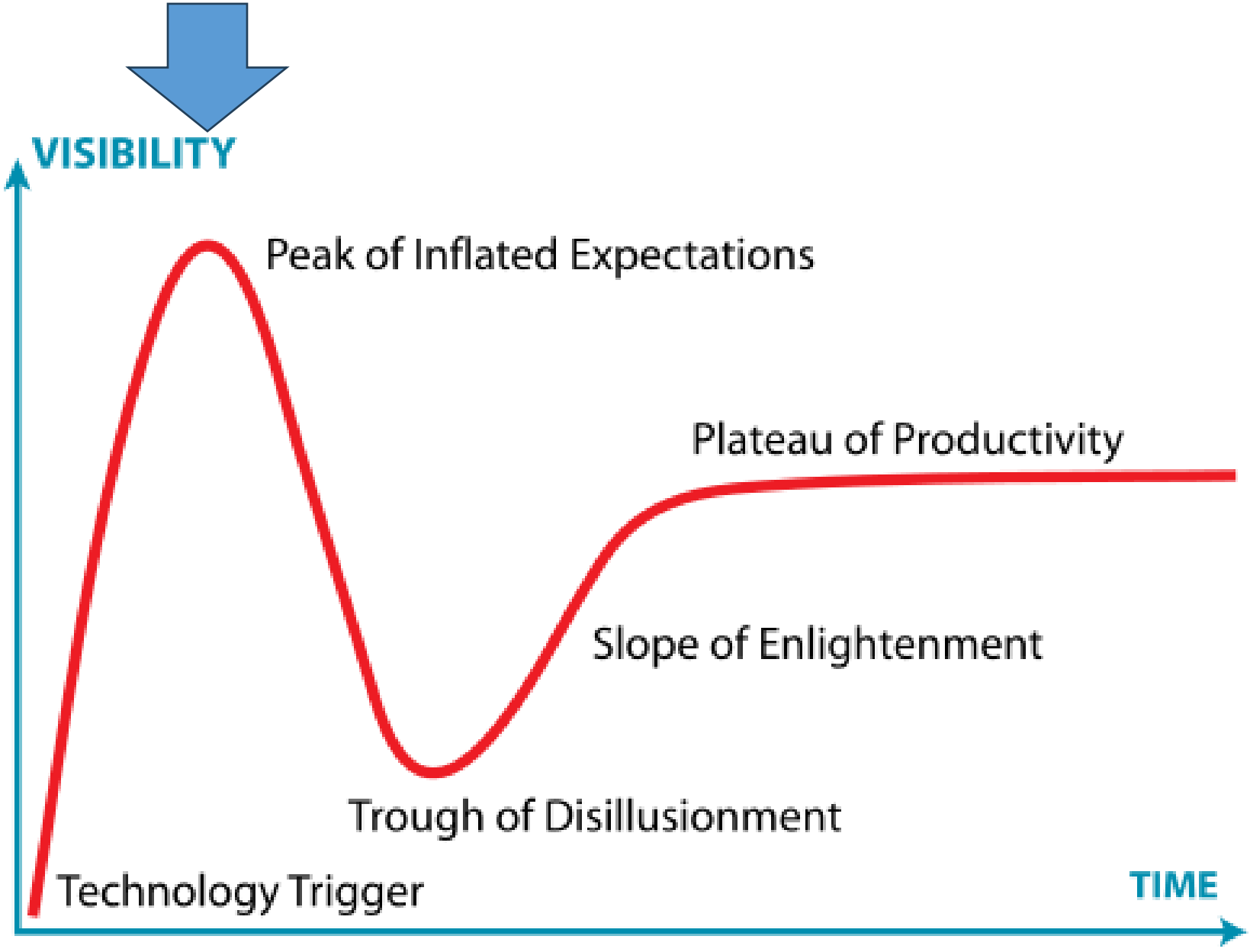

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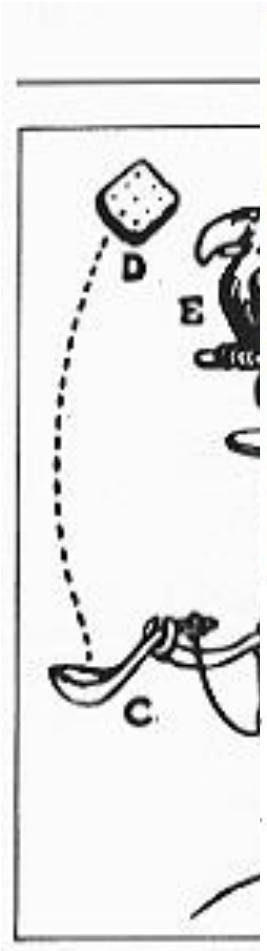
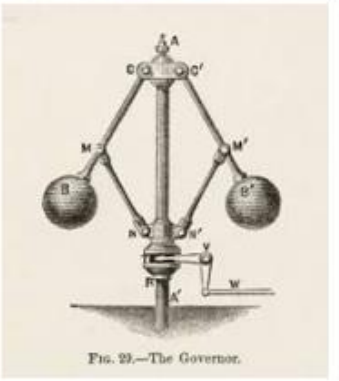
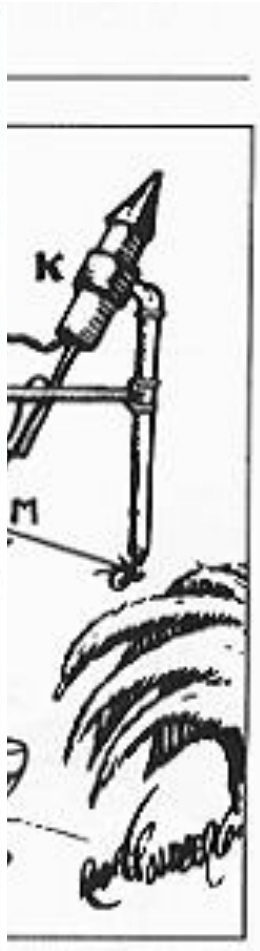
Message 1:
Healthcare will run 1000s of AI-based Agents.

- We will no longer have the human as ‘independent, fallible expert’ to relax the coupling between observation, insight, and action.
- How will we defend their use and assure their performance?
- How will these be coordinated in operation and in the (re-)design of systems and processes?
- Not to mention ROI and security…



The fly-ball governor – a second innovation to keep the steam engine speed stable.





This capacity does not exist in healthcare today. How do we build it? What will compel us to invest?

Message 2:
Data != Oil - Data use needs context; Oil use does not.

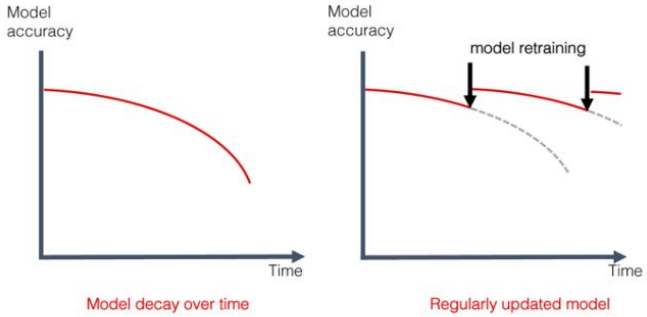
CANCER RESEARCH | CONTROVERSY AND CONSENSUS

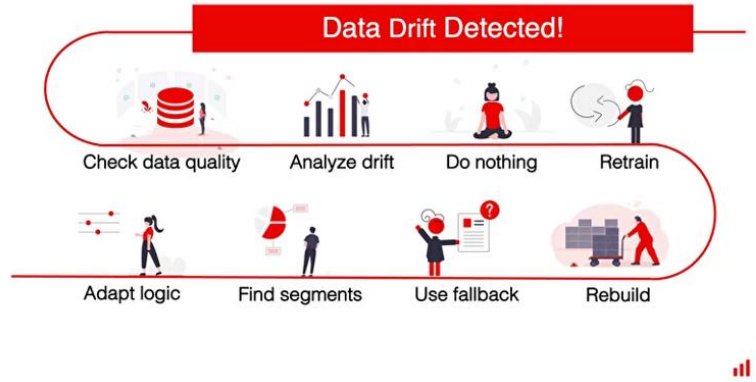
Cancer Needs a Robust "Metadata Supply Chain" to Realize the Promise of Artificial Intelligence

Caroline Chung and David A. Jaffray Cancer Res; 81(23) December 1, 2021

Principles:

1. Observations must be in context.
2. The quality of an observation is captured in the context.
3. Provenance links insights to observations.
4. Data governance must be granular and consistent with the needs of the demand.





https://evidentlyai.com/blog/machine-learning-monitoring-data-and-concept-drift

Are we willing to do the foundational work to realize the benefit? What are the other benefits beyond AI?

Message 3:
From co-Pilot™ to co-Investigator…AI & Science.

Article

Autonomous chemical research with large language models

"In this work, we present a multi-LLMs-based intelligent agent (hereafter simply called Co-scientist) capable of autonomous design, planning and performance of complex scientific experiments. "

Hypothesis and data generation in the lab…

Daniil A. Boiko[1], Robert MacKnight[1], Ben Kline[2] & Gabe Gomes[1,3,4]✉

Nature | Vol 624 | 21/28 December 2023 | 571

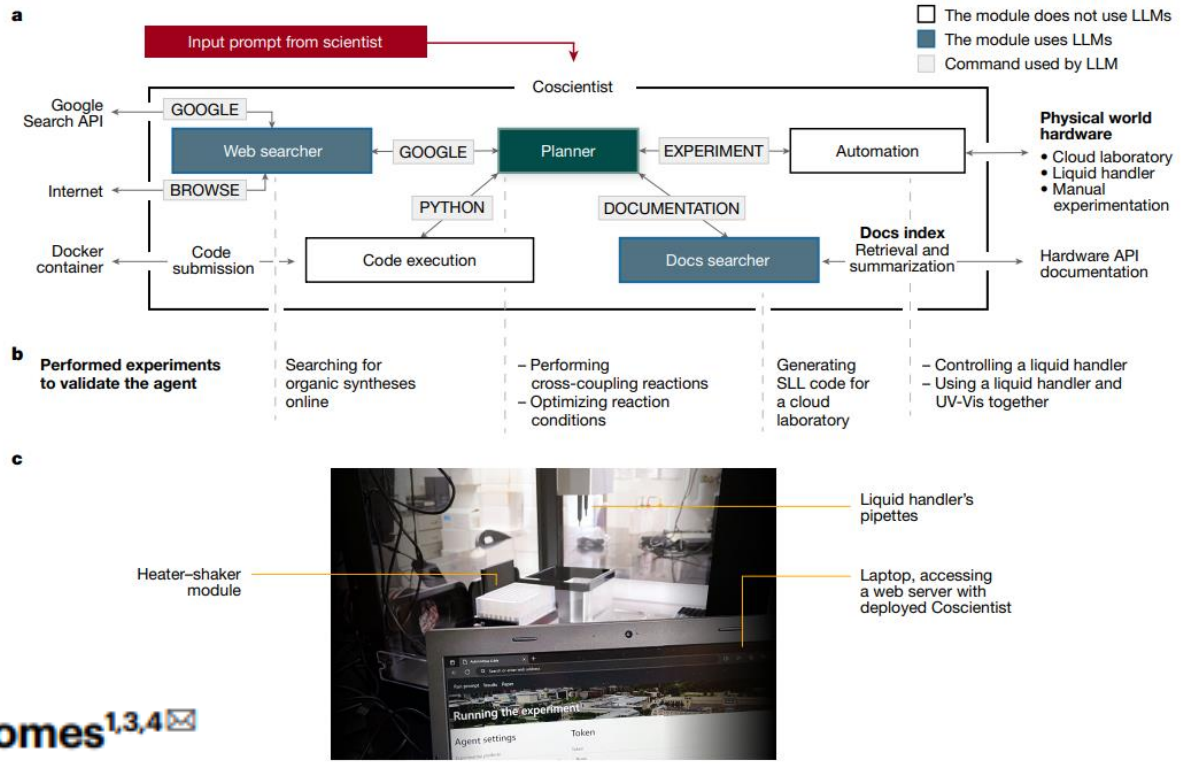
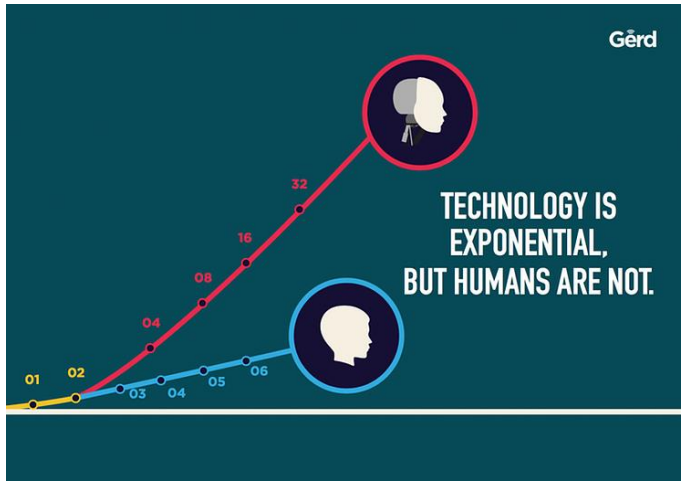


Fig. 1 | The system's architecture. a, Coscientist is composed of multiple modules that exchange messages. Boxes with blue background represent LLM modules, the Planner module is shown in green, and the input prompt is in red. White boxes represent modules that do not use LLMs. **b**, Types of experiments performed to demonstrate the capabilities when using individual modules or their combinations. **c**, Image of the experimental setup with a liquid handler. UV-Vis, ultraviolet visible.

What are the implications for academic science? What is the role of human insight? How will we validate?

Message 4:
Capitalizing on AI Depends on Innovation Skill.

- What is the problem we are solving? Innovation skill and discipline is required to really develop the case for need.
- Do we understand what decision we are supporting?
- How will we measure value? Need a data-driven approach – cost, benefit, downstream impact(s), unintended consequences.
- When do you turn-off an AI solution?



Creating a collaborative ecosystem with these skills will deliver results for our patients and attract a world of collaborators.

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No other technology has ever stressed our innovation skills like AI. Not the wheel, not the steam engine…

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Day 1 - Closing Remarks