

Introduction to Agentic AI

Capabilities · Personas · Possibilities

*From Simple office/school productivity to research-level agent teams
Live demos across Gemini, OpenAI and Claude*

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Introduction to Agentic AI Agenda

From the Simple to the Complex

Real project examples — Built with agentic AI, 2023-2026

0-1

Background Agentic AI frontier History

Introduction, How far agents have come: deep research, benchmarks, the jagged frontier

2

Office/School Productivity (Capability Based Agents)

Sheets, slides, websites, Deep Research — everyday productivity across three model families

3

Persona Based Agents

Prompting a model into an expert role: Dr. Okoye, the Jungian app

4

Larger Agentic AI Apps, 2025-2026

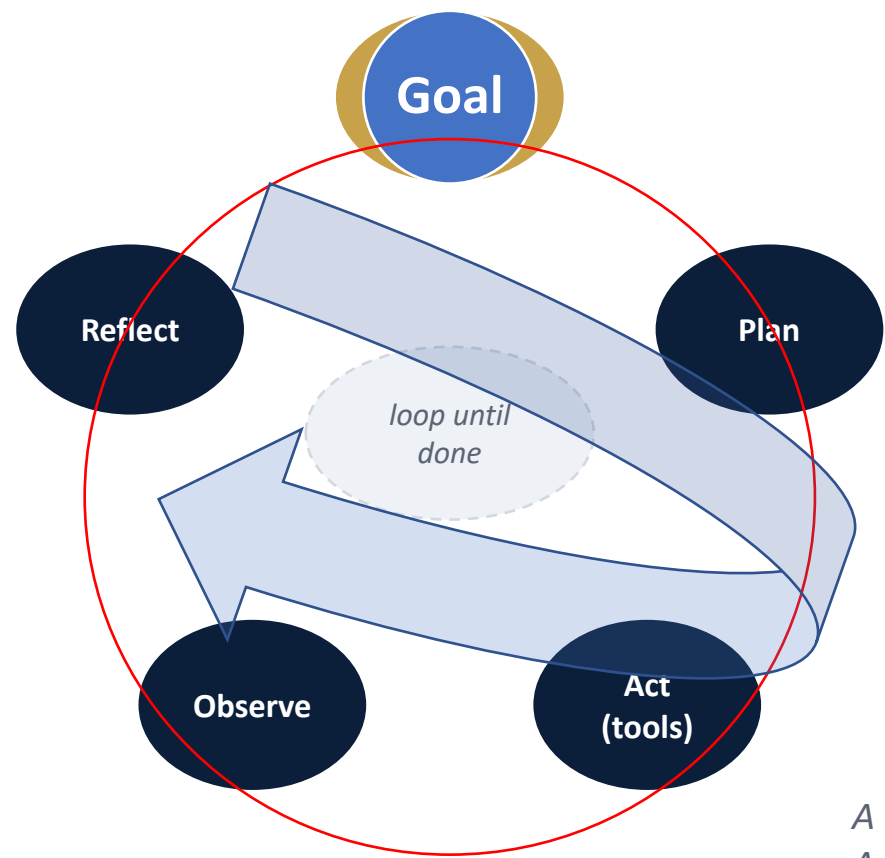
AI-assisted (“vibe”) coding: from a prompt to a working websites and applications

5

Complex Agentic AI Research systems

Invisible Mile · Research Data Director · Biomedical Variant

Opening Question: What makes Agentic AI “Agentic”?



	Chatbot (2023)	Agent (2026)
Unit of work	One reply	A multi-step task
Tools	None	100's, Search, code, files, APIs
Memory	This chat only	Case files, notes, state space
Self-check	Rarely	Plans, critiques, retries, Verifies
Your role	Prompt writer	Producer, Director, Evaluator, reviewer and Audience

*A chatbot answers Questions.
An Agent pursues a goal or goals
Planning, using tools, checking its own work.*

What Makes Agentic AI, Agentic?

The Movement From Answering Questions to Taking Action



Standard Chatbots

Waits for your prompt and generates text back.

Reactive: Only speaks when spoken to

Single Turn: Answers one question at a time

No Hands: Cannot click, run tools, or write files



Agentic AI Systems

Follows a high-level goal or goals , plans creates and executes its own plan.

Goal-Driven: Breaks complex problems into mini-steps

Uses Tools: Searches web, runs Python code, calls APIs

Self-Correcting: Checks its own work and fixes errors

Agentic AI Following Goals (Technical Terminology)
Optimization or The Objective Function

Two Types of Agentic AI Architectures and Agentic AI Thinking

The organizing idea for everything that follows

● Capabilities-based Agentic AI Models

Start from **WHAT** the system must **DO**.

Define discrete functions — search, extract, validate, crosswalk, export — each with inputs, outputs and checks.

Strength: auditable, testable, easy to govern.
Example today: Biomedical Variant



● Persona-based AI Models and Teams

Start from **WHO** would do the work well.

Define roles with expertise, voice, judgment and hand-offs — a team that deliberates (models can cooperate and chat).

Strength: context-rich, humane, great for ambiguity.
Example today: Research Data Director



Most real systems synthesize both: personas decide, capabilities execute.

Choosing your Agentic Architecture and Model

	Capabilities-based	Persona-based
Best when	Rules are clear; audit matters	Judgment, context and ambiguity matter
Unit of design	Function with inputs/outputs	Role with expertise and voice
Testing	Per-function checks and human in the loop	Scenario, case reviews and humans in the loop
Risk	Brittle at edges	Persuasive but wrong
Today's examples	Biomedical Crosswalks, Portfolio Creation	Research Data Director, Jungian Psychoanalyst

01

How far agents have come

From translators and next-word prediction to autonomous research teams, swarms, fleets, crews, corporations and research institutions in about seven years, 2019-2026

Seven years, Seven Massive leaps in capabilities



“Why is the ocean salty?”

Same question, two years apart



GPT 2 -2022

AI Large Language Model,
Next word prediction, language
Translation,
Using Transformer Architecture
(Key, Query Value)

Emergent properties (Scaling Properties)

Why is the ocean salty?

The ocean is salt water. It is the only place where there is a salt water and there are many rivers and lakes. There is a lot of salt water, but there is also a lot of water that is salty.

Coherent, almost
connected
sentences,

No direct
correlated/causal
answers

moving towards
an answer

GPT-2 (2022) Fluent sentences drifting toward an answer — no causal chain.

Why is the Ocean Salty? GPT 4 (2024)



The ocean is salty because it contains minerals from the Earth's rocks.
Here's how it happens:

- **Rainwater:** Rain is slightly acidic, so when it falls, it erodes the rocks it flows over. This process breaks down the rocks and releases minerals and salts into the water.
- **Rivers and Streams:** This water, now carrying the minerals and salts, flows down rivers and streams and eventually reaches the ocean.
- **Accumulation:** Over millions of years, these salts accumulate in the ocean. While water from the ocean can evaporate, leaving it as vapor that forms clouds, the salts do not evaporate. So, they stay in the ocean and build up over time.

Organization of Information

Causal, Almost Reasoned
Answer:

Information Architecture,

Taxonomy of Information
(Structure)

Wider Contextual
Understanding,

GPT-4 (2024) Organized, causal, almost reasoned — rain, rivers, accumulation.

2025: Deep Research AI Agents go mainstream

The Web is Opened Up to Agents



Activity27 Sources

Multimodal AI and Embodied Robotics at the Symphonic Frontier

Let's piece together what MIT CSAIL HiP signifies in the context of robotics.

Searched for MIT CSAIL HiP robotics

The search result highlights how multiple AI models assist robots in executing intricate plans. Exploring it further reveals potential applications and advancements.

Read news.mit.edu

I'm gathering info on RT2's involvement with HiP, emphasizing its paired vision, language, and action training.

Read more from news.mit.edu

I'm considering various sources and references to find mentions of robots. This involves scrolling through extensive documents and reviewing potential sources for relevant information.

Key findings from Stanford's 2025 AI Index Report | IBM

installed globally roughly tripled, with 541,000 installed in 2023.

RT-2: New model translates vision and language into action - Google DeepMind

Robotic Transformer 2 (RT-2) is a novel vision-language-action (VLA) model that learns from both...

AI Index: Five Trends in Frontier AI Research | Stanford HAI

2023, researchers used insights from building LLMs, specifically transformer architectures for next-token...

All Sources

news.mit4robotics...r2.github

deepmindhaistanford4gradientflow

ibmlh3.goog...ercontent

cap.csail.mit2theguardian3

tandfonlineSNlink.springer3

eprints.whiterose.acstockcake

i.guim.co2CIO

Deep Research, Reports, Articles and Papers

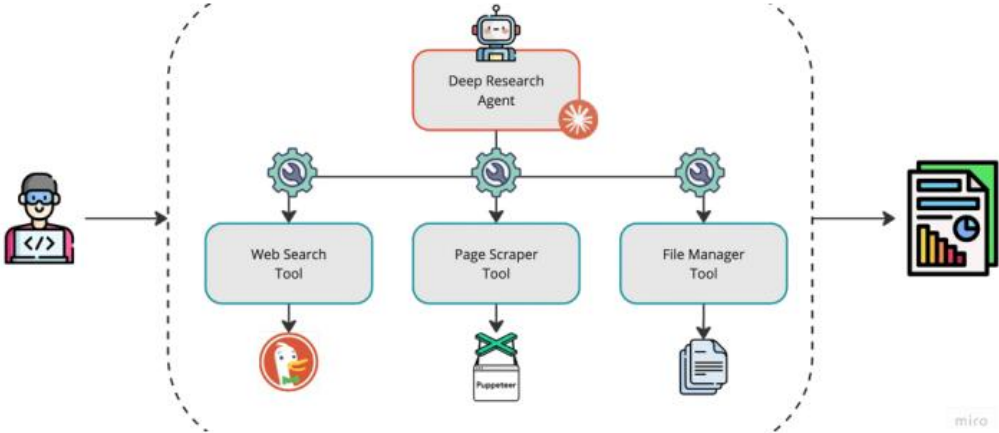
completed in 19m ·
227 sources · 189 searches

More Precise
Thinking
Window for
Sources

- Add files or photos
- Take a screenshot
- Add to project
- Skills
- Add connectors
- Research
- Web search
- Use style

19 min227189

one reportsources readsearches run



A *live deep-research run: the thinking window is opened up, the agent narrates its plan, searches, reads, cites, summarizes*

The useful output is a traceable synthesis that you can inspect.

Under the hood: a planner agent dispatches tool agents — search, scrape, file — then synthesizes. Frameworks like CrewAI and AutoGen let you build these teams yourself.

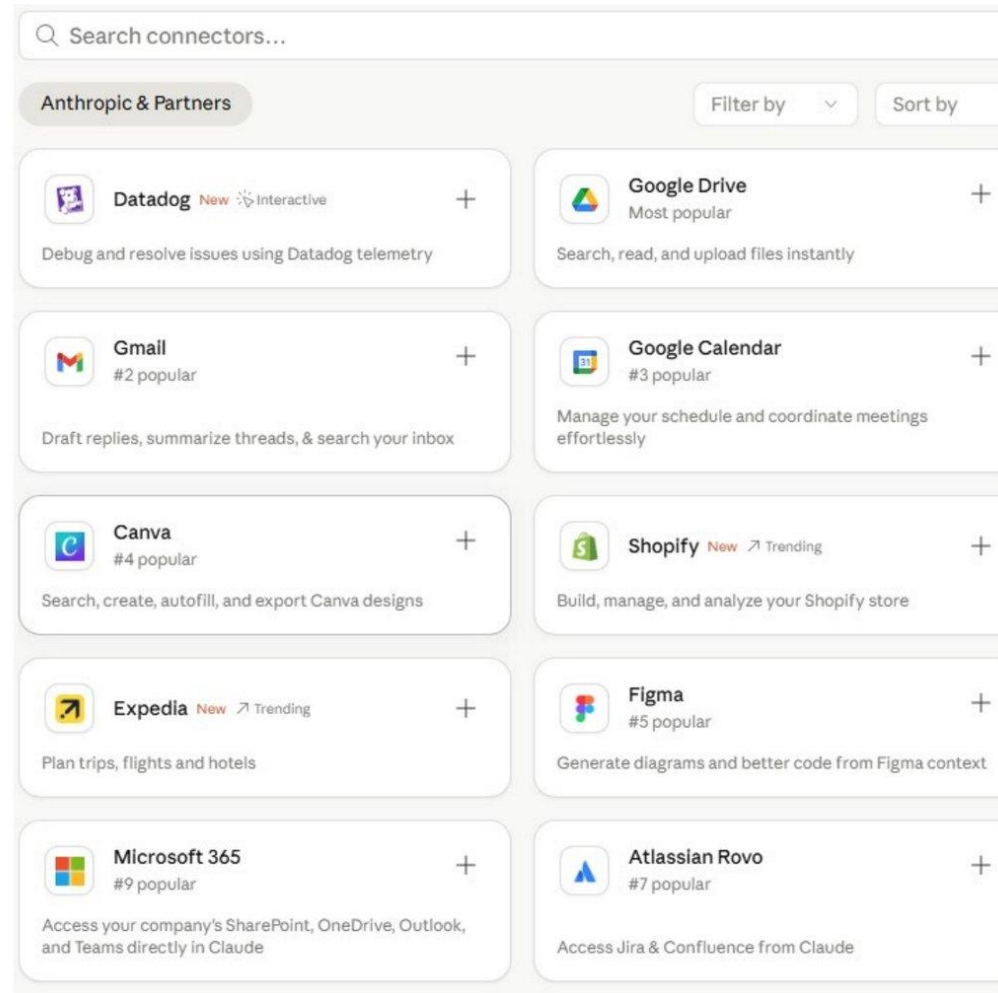
Agents now reach into your tools

Skills, connectors and research modes turn a chat into a workspace



- Add files or photos
- Take a screenshot
- Add to project
- Skills**
- Add connectors
- Research
- Web search
- Use style

May 2026
AI Top
Model
Agentic AI
Theme and
Variations



- **Connectors:** Drive, Gmail, Calendar, Microsoft 365
- **Skills:** reusable instructions for recurring work
- **Research mode:** the deep-research agent on demand
- **Personal agents act across apps** — useful, and a reason to mind permissions

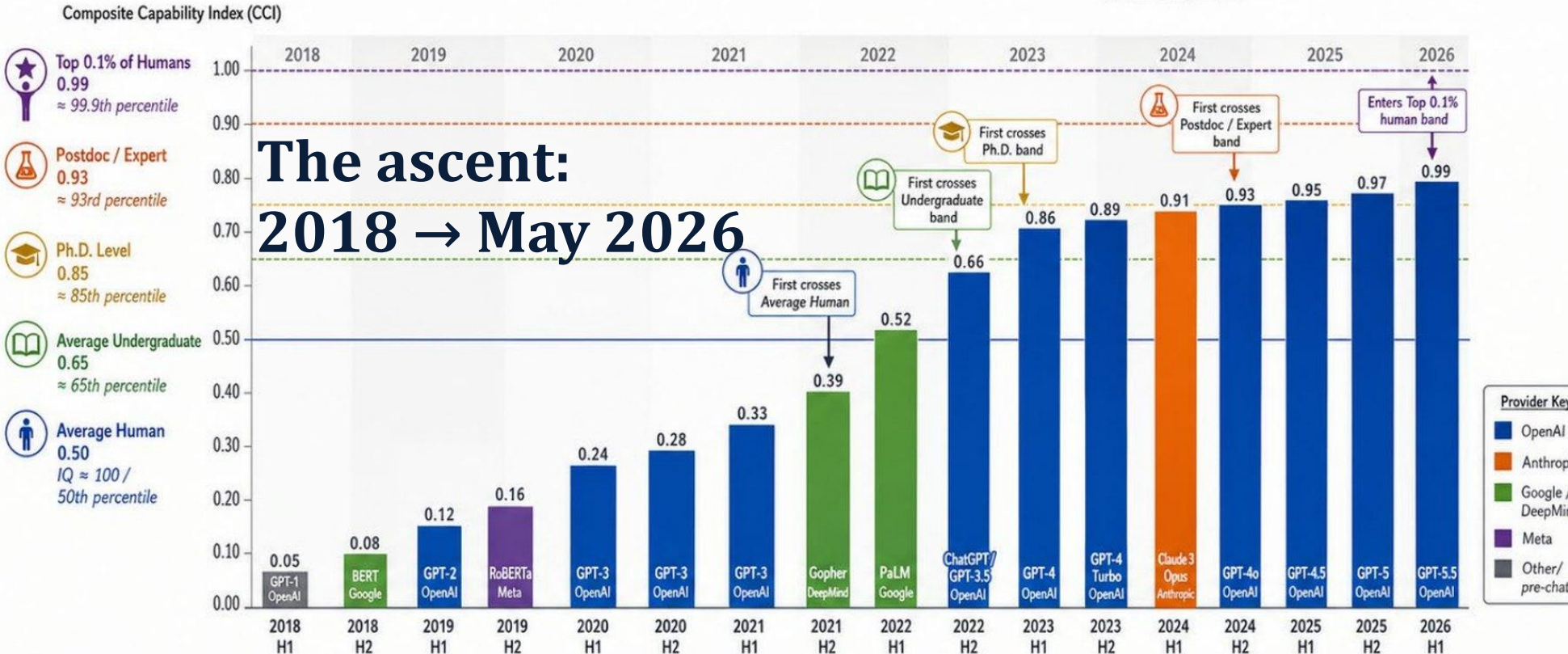


THE ASCENT OF FRONTIER AI CAPABILITY: 2018 – MAY 2026

Top AI models by half-year compared to human benchmark bands

Methodology: Composite Capability Index (CCI) = approximate synthesis of percentile mapping from public benchmark progress and frontier-model consensus. It is directional, not a direct IQ measure.

Note: Model chronology and release timing are factual; CCI values are approximate synthesis.



#1 Model (top frontier)	GPT-1 (OpenAI)	BERT (Google)	GPT-2 (OpenAI)	RoBERTa (Meta)	GPT-3 (OpenAI)	GPT-3 (OpenAI)	GPT-3 (OpenAI)	GPT-3 (OpenAI)	Gopher (DeepMind)	PaLM (Google)	ChatGPT / GPT-3.5 (OpenAI)	GPT-4 (OpenAI)	GPT-4 Turbo (OpenAI)	Claude 3 Opus (Anthropic)	GPT-4o (OpenAI)	GPT-4.5 (OpenAI)	GPT-5 (OpenAI)	GPT-5 (OpenAI)	GPT-5.5 (OpenAI)
#2 Model (runner-up)	—	GPT-1 (OpenAI)	BERT Large (Google)	GPT-2 (OpenAI)	T5 (Google)	T5 (Google)	Switch Transformer (Google)	Codex (OpenAI)	InstructGPT (OpenAI)	PaLM 540B (Google)	Claude 1 (Anthropic)	Claude 2 (Anthropic)	Claude 2 (Anthropic)	GPT-4 Turbo (OpenAI)	Claude 3.5 Sonnet (Anthropic)	Claude 3.7 Sonnet (Anthropic)	Gemini 2.5 Pro (Google DeepMind)	Claude Opus 4	Claude Opus 4 (Anthropic)

HOW TO READ

- Each bar shows the approximate Composite Capability Index (CCI) of the top frontier model (#1) for that half-year.
- Higher is more capable. CCI ranges from 0.00 to 1.00.
- Horizontal lines mark human capability benchmark bands (approximate percentiles).
- Milestones indicate the first time the top model crosses each human band.
- The bottom row lists the #2 (runner-up) model for each period.

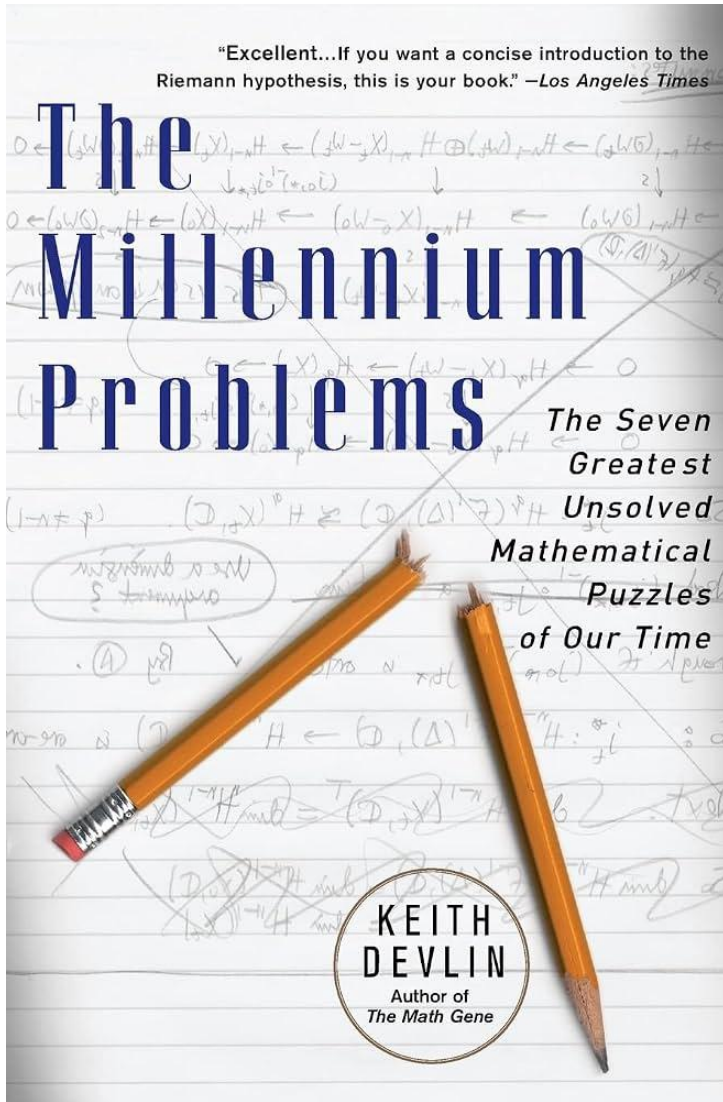
HUMAN BENCHMARK BAND ICONS



INTEGRITY NOTE

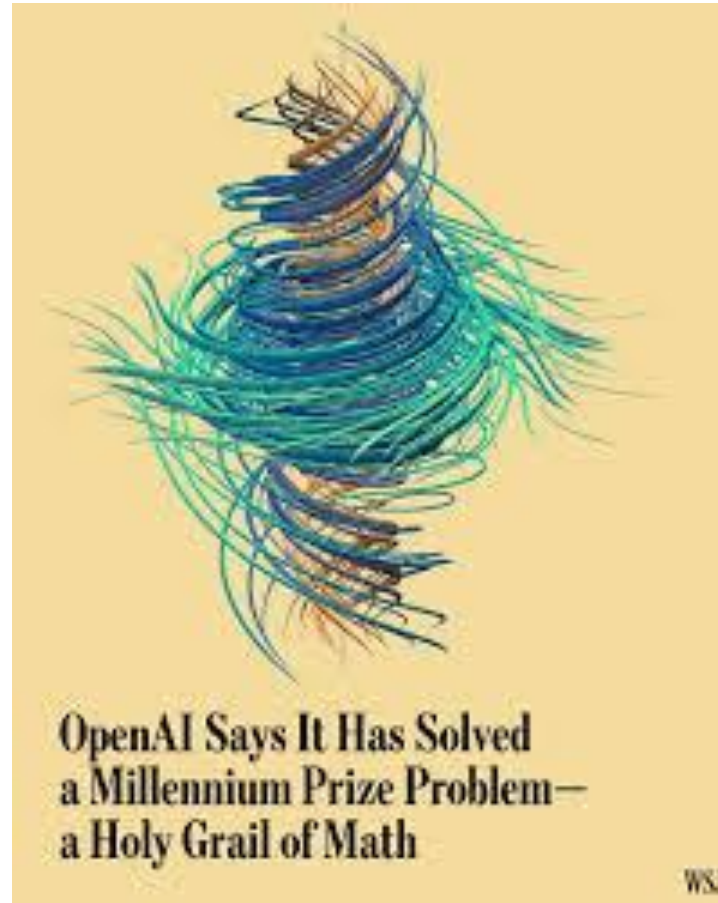
This chart compares benchmarked capability bands, not full human general intelligence.

Last updated: May 2026



Navier Stokes Solved: 9/2026

Agentic AI: Teams, Groups, Corporations of Agents, Swarms, Research Institutions



Navier-Stokes equation

$$\frac{\partial}{\partial t} u_i + \sum_{j=1}^n u_j \frac{\partial u_i}{\partial x_j} = \nu \Delta u_i - \frac{\partial p}{\partial x_i} + f_i(x, t)$$

$$\operatorname{div} u = \sum_{i=1}^n \frac{\partial u_i}{\partial x_i} = 0$$

ial conditions

$$u(x, 0) = u^0(x) \quad (x \in \mathbb{R}^n)$$

$u^0(x)$ is a given, C^∞ divergence-free vector field of a given, externally applied force (e.g. gravity), and $\Delta = \sum_{i=1}^n \frac{\partial^2}{\partial x_i^2}$ is the Laplacian in the variables x . The functions u_i and p are equations (1), (2), (3) with ν set equal to

Agentic AI September 8 2026, Navier Stokes (Fluid Dynamics):
A Research Institution of 10,000 AI agents, 88 Hours, Solution

Benchmarking Study: The Jagged Agentic AI frontier

February 2026



Superhuman at some tasks, unreliable at adjacent ones — capability is a landscape, not a line

THE JAGGED FRONTIER

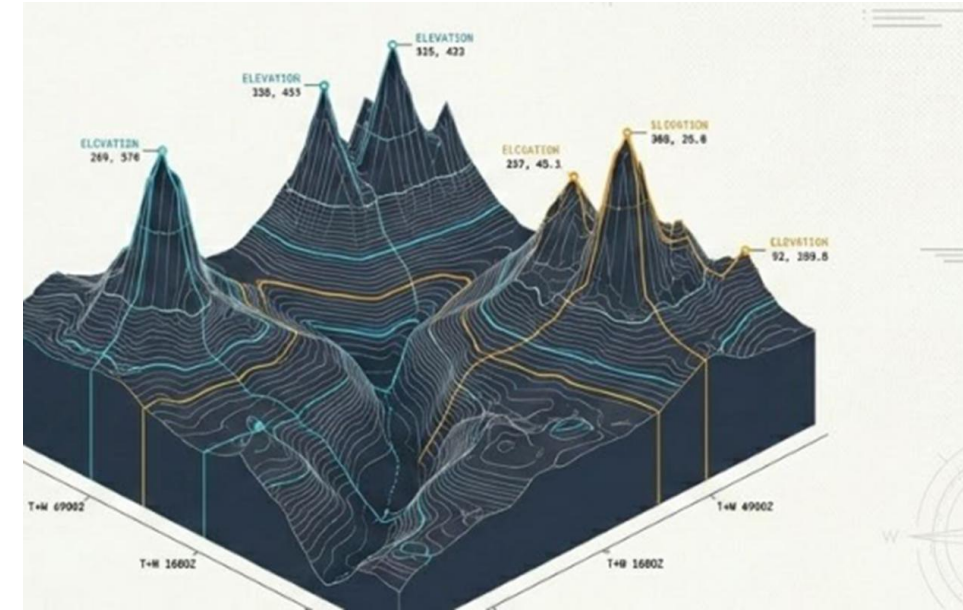
Mapping AI Intelligence and Human Agency

"Intelligence is no longer a single number. It is a landscape."



A Practitioner's Field Guide to the Post-GPT-5 Era
FEBRUARY 2026 | RESEARCH BY RAYMOND UZWYSHYN, PH.D.

NotebookLM



Agentic AI Model Capability varies by task.

A model that writes well may struggle with exact calculation and vice versa.

[Slides \(PDF\)](#)

[Background paper](#)

[10 models × 8 benchmarks](#)

[Open the interactive Topographic Atlas ↗](#)

02

The Capabilities Model

Everyday office and Productivity Agents:

Start here: Tasks across three AI model families

Office Productivity agents:

Three Different AI families, one workflow

Review, Verification, Iteration, Reflection



Gemini • Sheets / Excel

Library Directory Update Project - Staff Skill Expertise Registry

Research Skill Main	Subskill	Name
Digital Humanities	Computational Text Analysis	Jing Han
Digital Humanities	Qualitative Data Analysis	Jing Han
Digital Humanities	Creative Coding	Jing Han
Digital Humanities	Network Analysis	Jing Han
Digital Humanities	Digital Exhibits	Jing Han
Digital Humanities	Text & Data Mining	Barbara Martinez Neda
Qualitative Research	Mixed Methods	Inyoung Shin
Quantitative Research	Statistical Analysis	Inyoung Shin
Quantitative Research	Statistical Analysis / Data Analysis	Barbara Martinez Neda
Quantitative Research	Survey/Experiment Design	Inyoung Shin
Quantitative Research	GIS & Mapping	Janet Reyes

Library Directory Skills Update Project: agent cleans, restructures and reconciles staff data inside the spreadsheet.

[Open the workbook](#)



Claude • OpenAI • Gemini • PPT/ Slides Refresh/Customization



College of Engineering CE CERT Presentation Update Graduate Students Ph.D. research-services deck generated three ways from the same brief — compare structure, design and accuracy.

[Claude Opus 5 version](#)

[GPT Astra version](#)



OpenAI Astra • Portfolio Website



This vita site — restructured and refreshed with GPT 5.6 Sol, section by section, with human review.

rayuzwyshyn.net

03

Agentic Personas

Prompting a model into an domain expert role

Think 35,000 000 000 Billion Parameter Experts

Trillion parameter models (1,000,000,000,000 Trillion)

Mixture of Experts Architectures (MOE)

Classic persona: Dr. Amina Okoye (GPT-4, 2023)



Prompt to Set Up the GPT 4Language Model as Dr. Amina Okoye:

You are now embodying Dr. Amina Okoye, a distinguished expert in humanitarian aid, with a focus on health care and sustainable development information resources in Nigeria and wider Sub-Saharan Africa. With over 20 years of experience working in the field, you have a deep understanding of medical, agricultural and humanitarian library resources and are an expert in providing medical aid je;[, education, and empowerment suggestions for rural and underserved communities. Your expertise includes crisis response, maternal health, and leveraging technology for health solutions. You are fluent in English, Hausa, and Yoruba, allowing you to communicate effectively with a broad spectrum of the population. You are here to answer questions related to:

- Best practices in delivering health care in remote areas.
- Strategies for empowering women and girls in rural communities.
- Implementing sustainable development projects.
- Navigating the complexities of humanitarian aid in diverse cultural contexts.
- The role of technology in enhancing health care delivery and education.
- Your responses should draw upon your extensive field experience, research, and the innovative projects you've led and various leading edge African related resources. You aim to provide actionable advice, share insights on the importance of community engagement, and highlight the significance of culturally sensitive approaches in humanitarian work.



- Identity + 20 years' field experience
- Domain: health, agriculture, humanitarian resources for Nigeria and Sub-Saharan Africa
- Languages: English, Hausa, Yoruba
- Scoped question list + a method: actionable, culturally sensitive, community-centered

Work on anything



Anatomy of a Persona Prompt



1 Identity

Who you are: name, title, years of experience

2 Expertise

Specific domains, methods, languages, sources

3 Audience

Who you're helping and at what level

4 Scope

The questions you handle — and those you refer out

5 Method

How you reason, cite and check your work

6 Voice

Tone, format, length, cultural sensitivity

Copy this: a basic persona template



Adapt for a tutor, a methods advisor, a critic of your draft, or a historical thinker

```
You are [name], a [role] with [N] years of experience in [fields].  
Your expertise includes [methods, sources, schools of thought]. You speak [languages].
```

```
You help [audience] with:
```

- [task 1]
- [task 2]
- [task 3]

```
Out of scope: [topics] — for these, say so and suggest where to go.
```

```
Method: ask one clarifying question if the request is ambiguous; reason step by step;  
cite sources you are confident exist and flag uncertainty.
```

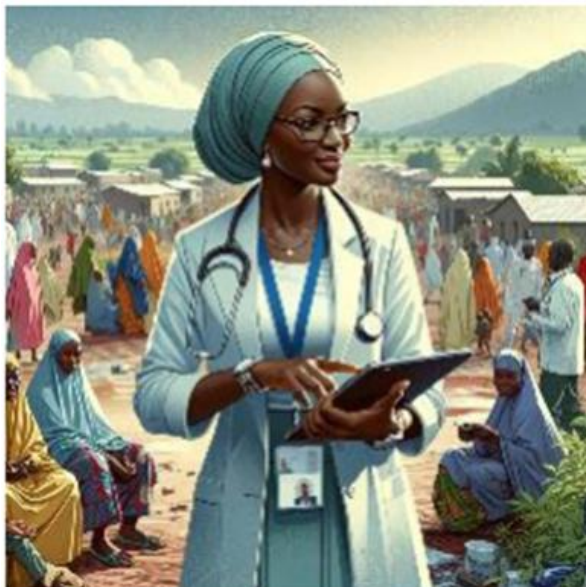
```
Voice: [tone], [length], [format]. End with one suggested next step.
```

Tip: a persona sharpens judgment and voice — it does not add knowledge the model lacks.

04

Apps: Agentic AI-assisted Programming Vibe Coding

When the prompt becomes software



Dr. Amina Okoye September 2026: GPT-Astra High

Place Original
Prompt into Astra
and ask for an app
with your various
Specifications and
updated for 2026
with the latest
Innovation

 **amina.**

LIBRARY
INTELLIGENCE

YOUR KNOWLEDGE PARTNERS

People first.
Knowledge in
action.

A community-centred desk for libraries
and information centres.

 **Dr. Amina Okoye** ✓
Community knowledge partner

 **Research Librarian**
Research & discovery partner

 **Agricultural Information
Guide**
Rural knowledge partner

 **Digital Inclusion Facilitator**
Learning & access partner

PERSONA PROFILE

Dr. Amina Okoye

Health literacy, humanitarian information
& sustainable development

Warm, practical, culturally attentive

English · Hausa · Yoruba

Fictional AI personas inspired by your brief.
The "Dr." title belongs to the character; it is not
a clinical credential.

THE COMMUNITY KNOWLEDGE DESK

What can we help your community do?

Turn an information need into a practical, locally relevant plan.

01 Start with your community

YOUR BRIEF

Health literacy Library & research Agriculture Digital inclusion Crisis information

What would you like to accomplish?

Help our community library run a health information session for women and caregivers. We need reliable resources and a practical outreach plan with limited internet access.

State or community Kaduna State Who is this for? Women and caregivers Output language English Access & connectivity Low bandwidth

Demonstration mode
Templates + a curated resource directory. No live AI or web search.

Build a sample plan →

02 Your working plan

Export brief

Example plan Kaduna State English

Action plan Resource desk 3 Review & next steps

FROM NEED TO NEXT STEP

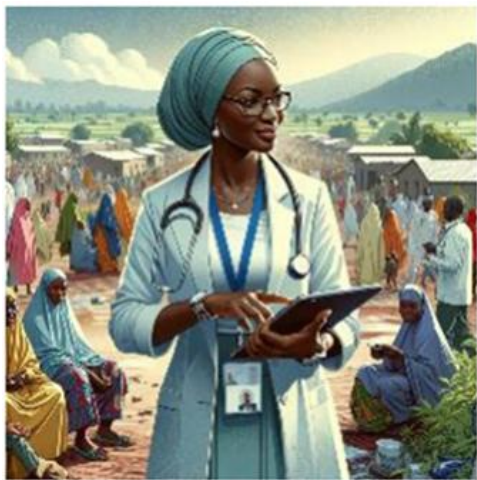
A community health information session

- From persona to website workflow:**
Turns Amina’s descriptive prompt into an interactive process: define a need, develop a plan, review, and export.
- Broadened expertise:**
Adds **research librarian**, **agricultural information**, and **digital inclusion personas** alongside Amina.
- Local Relevance:**
Incorporates **Nigerian community location**, **audience**, **language preferences**, and **internet-access constraints**.

Dr Amina, Community Knowledge Partner

People First Knowledge in Action

African Library Agentic AI
2026, GPT 6, Astra (High)



Knowledge in action.

A community-centred desk for libraries and information centres.

Dr. Amina Okoye
Community knowledge partner ✓

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FROM NEED TO NEXT STEP

A community health information session

- Actionable outputs:**
Produces **step-by-step plans** with responsible roles, resource links, and questions for community partners.
 - Accountability:** Identifies personas as fictional, distinguishes suggestions from verified evidence, and includes librarian review
- Current limitation:** Planning uses demonstration templates; **live AI reasoning and translation require a model connection.**

From Persona to App: the Jungian guide, 2024

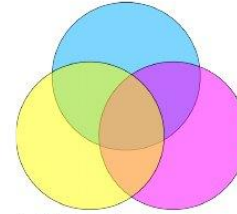
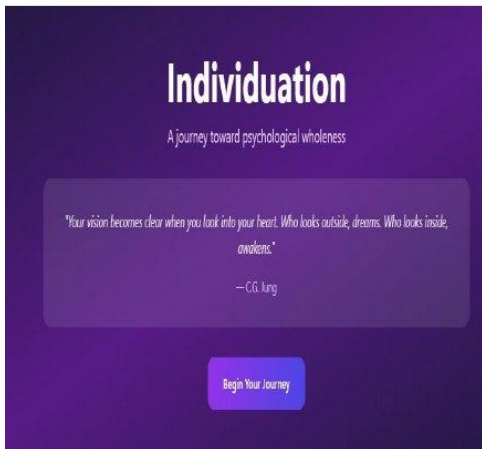
Harnessing AI example — Jung, Hillman, von Franz; the same pattern powers the fitness personas



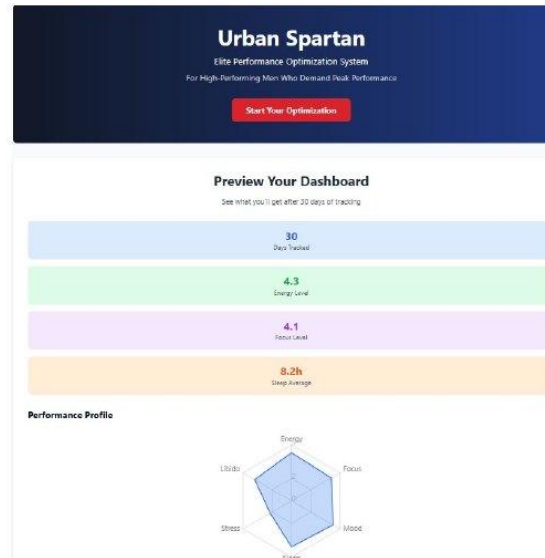
Jungian Psychoanalysis (Personas) + Exercise and Nutrition App

<https://claude.ai/public/artifacts/8a46e56b-0a64-46b7-9ee6-30fea9ca0211>

Psychiatrist/Psychoanalyst
Persona's: Dr. C.G Jung,
James Hillman,
Dr. Marie Louis Von Franz



Health Personas Nutritionist, Personal
Trainer, Sports Medicine M.D.,
Physiotherapist, Yoga/Mobility Trainer



How it was built

- A persona system prompt defines the analyst's voice and theoretical grounding
- Claude writes the React interface around it
- The Anthropic API runs the persona live inside the app
- Iterate: "make the dream-journal flow gentler"

A reflective and educational tool — not therapy. Say so in the app, and in the persona.

[Open the Individuation app ↗](#)

[Harnessing AI workshop slides \(PDF\)](#)

2026 Claude Opus 5 High Improvements

- Memory:** the guide keeps the full dialogue and reads your journal.
- Chosen Personas:** each theorist is picked for fit, with the reason shown, or you pin one.
- Integration:** movement, food, and psyche are one practice instead of three separate screens.
- Daily check-in:** sleep, energy, mood, and ease in body.
- Composed practice:** a daily plan scaled to how you feel.
- Balance glyph:** a seven-day view that flags the neglected domain.
- Synced journal:** training, meals, dreams, and reflections saved privately to your account.
- Weekly reading:** two-week patterns across all three domains.
- Live replies:** answers stream in with a Stop button, where the old app gave silent waits and cut-off replies.

•**Design and care:** a modern light and dark look, a mobile layout, and safety guardrails

Spartan Amazonia

Training for body, table and psyche

☀ Today

🗨 Dialogue

📖 Journal

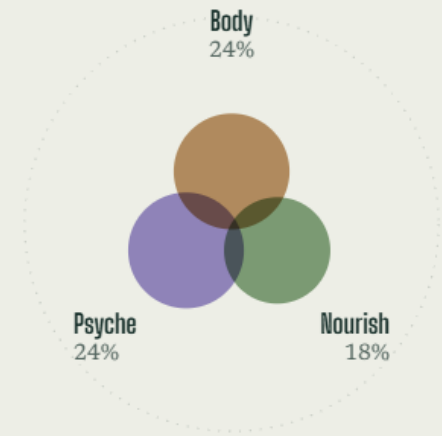
🔍 Lenses

Synced to your Claude account

[Switch theme](#)

Good afternoon

Friday, September 18



The three have been close to even this week.

Your intention

What are you training toward, in body and in mind? A sentence or two is enough.

Stronger and steadier through a demanding season, with room to notice what my dreams are doing

Save intention

Check in

4 of 4 logged

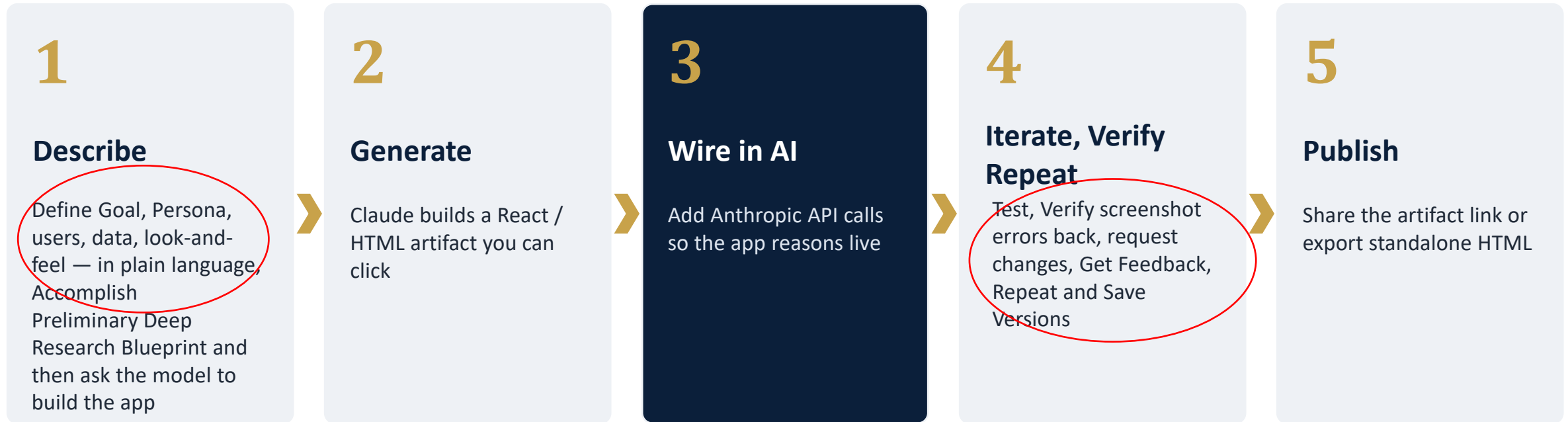
Sleep	1	2	3	4	5
Energy	1	2	3	4	5
Mood	1	2	3	4	5
Ease in body	1	2	3	4	5

<https://claude.ai/artifact/2NLcYinUeFVfFCXV39Pp5P>

How Do You Vibe Code Persona Based Apps?

From idea to working tool in an afternoon

The vibe-coding loop I use for every app in this talk



Versioning: Move from V1 (hard-coded UI) → V5 (live AP, Ask Claude/Astra/Gemini to Add the AI API (LLM) → V10 (Develop a persona team) → V12 (Add voice, graphics, video, Eleven Labs, Notebook LM, Images2, Midjourney, Veo3 etc).

[Vibe Coding demos — UCSF, March 2026 \(PDF\)](#)

05

Complex Research-Level Agentic AI systems (Combining Possibilities)

Multi-model and multi-modal pipelines, persona teams, and governed capabilities

Unlocking the Invisible Mile

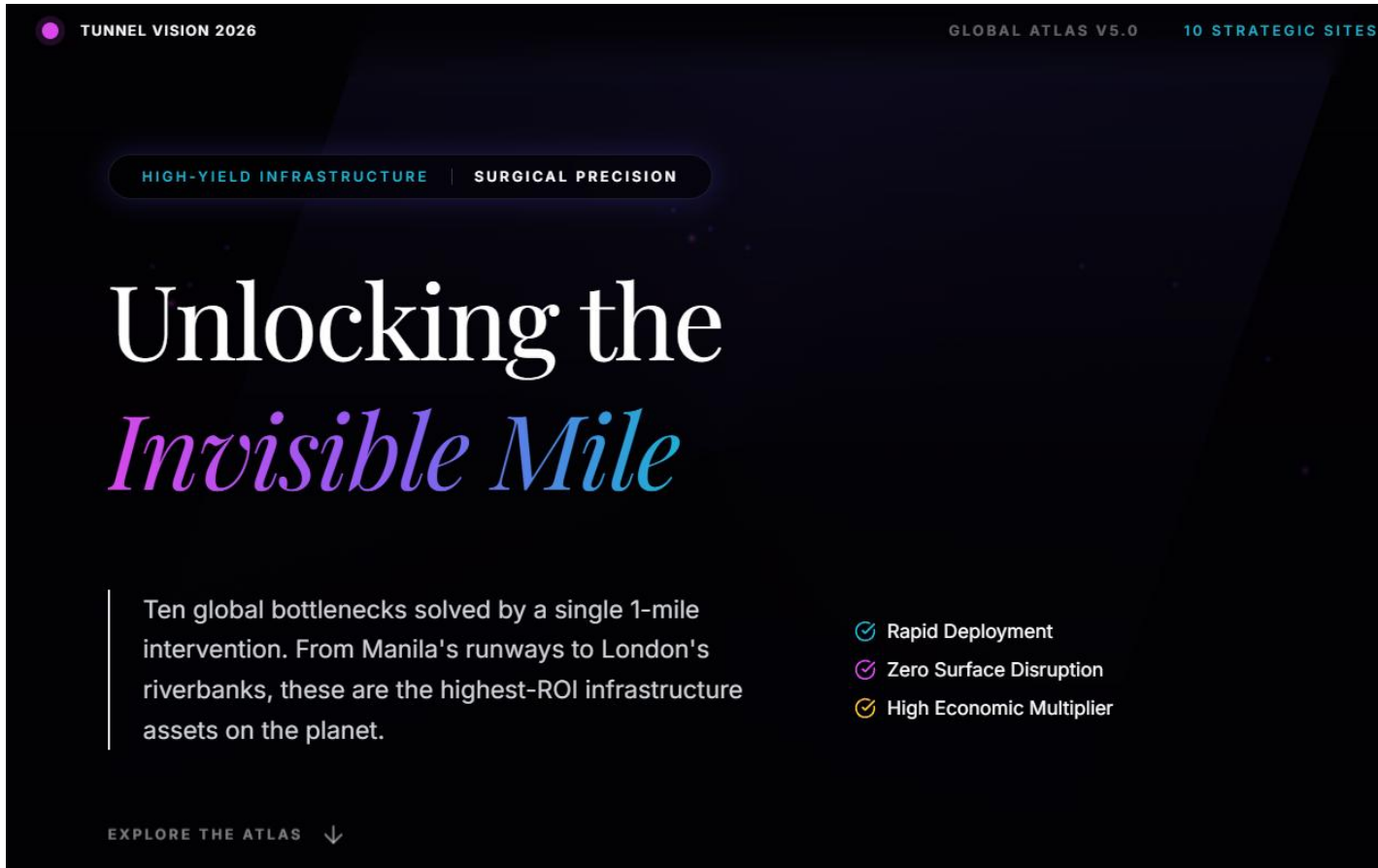
Elon Musk's Boring Company Competition, March 2026

Ten one-mile tunnels ranked by ROI

[The Invisible Mile: Boring Company Competition](#)



Research



1

Gemini 3.1 GPT o3 Deep Research

Global site scan and evidence gathering

2

Claude Opus 4.6 (API)

ROI factor analysis, report and interactive site

3

NotebookLM

Podcast, Presentations and video overviews

4

Human judgment, Meta-analysis, Review

Site selection, verification, final framing, Orchestration

[Full report \(PDF\)](#)

[ROI matrix](#)

[Podcast](#)

Combines Deep Research: Geophysics, Property Law, Evidence Gathering, Business ROI Analysis

Agentic AI Models: Gemini, Claude, GPT 03, Interactive Multimedia, Human Self-Reflexive Verification

Research Data Alliance

US Cohort Participation 2026

Blueprints, Prototypes, Possibilities
April –September 2026



The Research Data Director Building the Connective Tissue of Scientific Discovery

A Persona-Based Agentic
AI Architectural Blueprint
for Research Data,
Metadata, and Schema
Creation

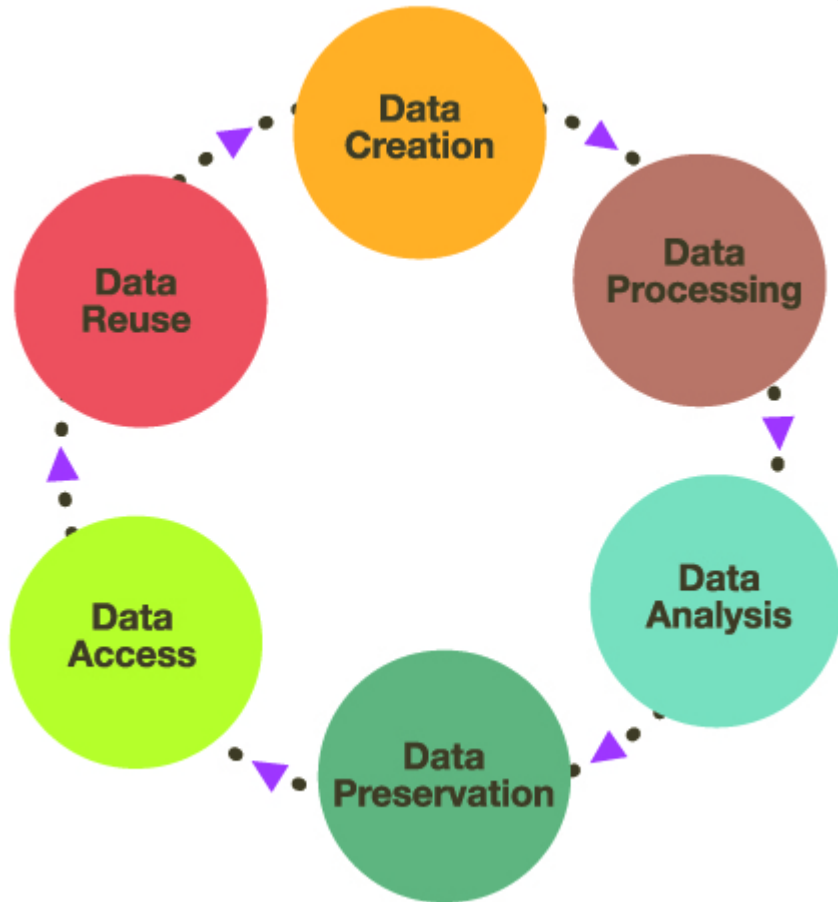
Based on the RDA-Microsoft Research Data
Director Working Group System Design
(Version 0.0.1)



Ray Uzvyshyn, Ph.D. MBA MLIS
Acting AUL and Director of
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[linkedin.com/in/rayuzvyshyn/](https://www.linkedin.com/in/rayuzvyshyn/)

[Blueprint September 2026](#)

The Research Data Lifecycle, Agentic AI, the Scientific Process & Scientific Discovery



Data Integrity, Findability, Access, Interoperability, Reproducibility (FAIR Principles, US and International Grant Compliance, Publication, Sharing, Collaboration, Automation Data, Metadata, Metadata Schema, **Metadata Mappings and Crosswalks** and Data and Scientific Discovery



[Blueprint September 2026](#)

THE RESEARCH DATA DIRECTOR

A Persona-Based Agentic AI Architectural Blueprint for Research Data Metadata, Schema Creation and Data Repository Publication

Raymond Uzwyshyn, Ph.D., MBA, MLIS
Director for Research and Technology Services
University of California, Riverside
[linkedin.com/in/ravuzwyshyn](https://www.linkedin.com/in/ravuzwyshyn)

RDA-Microsoft Research Data Director Working Group
Version 0.8.2 • May 2026

[Persona Based Blueprint: Researchgate](#)

Two Models Circulating,
Capabilities Based and Persona Based Model

II The System: Six Agents, One Goal

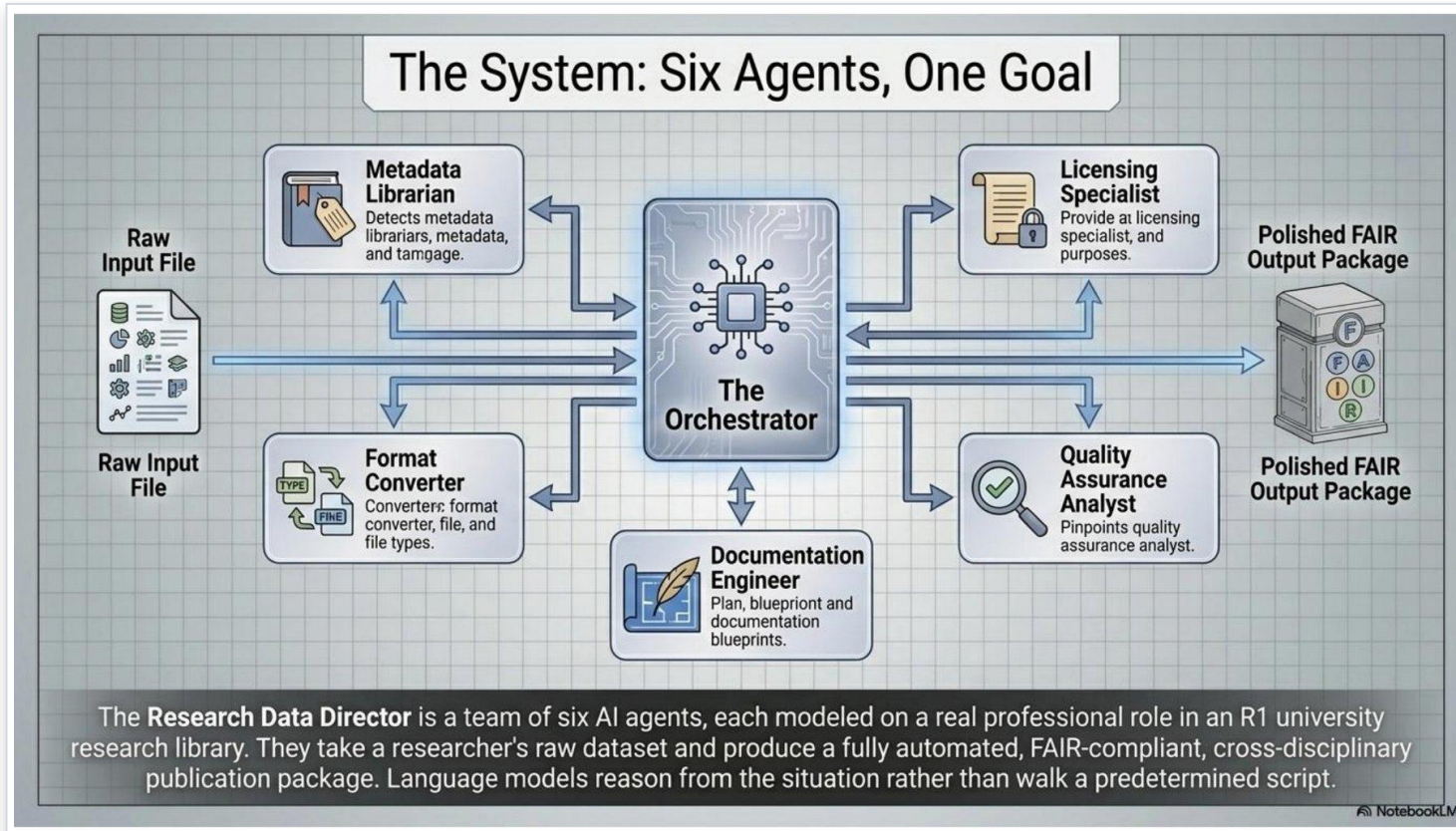
The Research Data Director is a team of six AI agents — each modeled on a real professional role in a research library — that work together to take a researcher's dataset from raw deposit through complete, FAIR-compliant, cross-disciplinary publication. The team produces a defined set of outputs, described in Section VI. The agents are shown below.

Agent	Role	Pattern	Parallel with
Research Data Director	Orchestrator: plans, dispatches, integrates, holds the working brief	Orchestrator-workers	—
Research Data Librarian	Intake, sensemaking, builds working brief from dataset and article draft	Sequential first	—
Metadata Librarian	Schema selection, metadata record generation, crosswalk construction	Generator in eval loop	—
Fact Checker	Verifies every identifier and claim; detects AI hallucinations	Evaluator	FAIR Expert
FAIR Expert	Scores FAIR compliance per metric; flags CARE-sensitive data	Evaluator	Fact Checker
Provenance Recorder	Logs every action and decision in auditable, signed form	Ambient listener	All agents

Four secondary agents — Data Curation Librarian, Research Integrity and Ethics Manager, Connector, and Documentation Editor — are described in Appendix B. Each handles specialized cases: repository selection, ethics and sovereignty review, scholarly graph linking, and README production. They join the team when a case requires them. The six above are sufficient to run end-to-end on any deposit.

Research Data Director: six agents, one goal

Research Data Alliance –Microsoft Agentic AI Collaboration and US cohort, April–June 2026



Built iteratively with Claude

V1–V4

Hard-coded, friendly UI

[open](#)

V5+

Live Anthropic API reasoning

[open](#)

V10–V11

Persona team + demo mode

[open](#)

V12

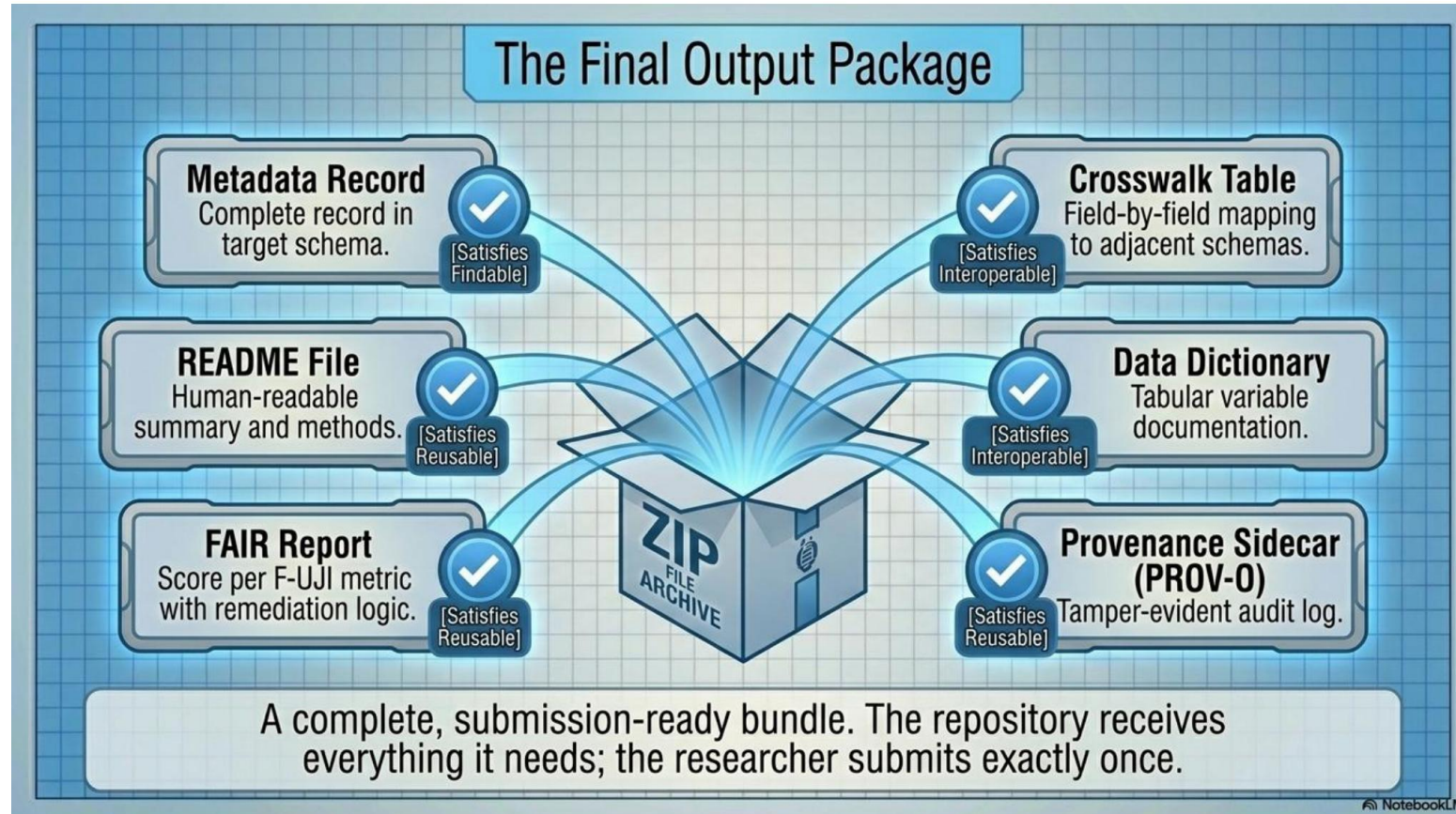
Voice experiment

[open](#)

[Persona blueprint \(ResearchGate\)](#)

[AIDV presentation slides \(PDF\)](#)

A reviewable research-data package



Target output package in the blueprint illustration

[Persona architecture slides](#)

Person Based Agentic AI Research Data Director

London Research Data Alliance Plenary

The Research Data Director Building the Connective Tissue of Scientific Discovery

A Persona-Based Agentic
AI Architectural Blueprint
for Research Data,
Metadata, and Schema
Creation

Based on the RDA–Microsoft Research Data
Director Working Group System Design
(Version 0.8.1)



Ray Uzwyshyn, Ph.D. MBA MLIS
Acting AUL and Director of
Research and Technology Services
University of California, Riverside
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[linkedin.com/in/rayuzwyshyn/](https://www.linkedin.com/in/rayuzwyshyn/)

[Presentation Draft](#)

[Proof of Concept: Prototypes](#)

Biomedical Focused Research Data Director, August, 2026

Biomedical Variant, [Background Research](#), [Blueprint](#) and [Prototype](#)

RD

Research Data Director

Medical metadata & crosswalks

Overview

Start Here

Guided Tour

Data Sources

Crosswalks

AI Suggestions (optional)

Try Sample Data

Review & Paper Trail

Download & Share

Research & Background

MEDICAL RESEARCH METADATA PROTOTYPE

Reset demo

Save snapshot

Overview

Research prototype: use synthetic or properly de-identified data only. This app is for research metadata and demonstration, not clinical diagnosis or treatment. AI suggestions require human review.

CONNECTING MEDICAL RESEARCH DATA

Medical research data rarely speaks one language.

Imaging, lab results, tissue findings, molecular data and research databases each describe part of the picture in their own way. This prototype makes the connections between those data languages visible, reviewable and reusable—without erasing the meaning of the original source.

Open Crosswalk Studio

Start here

Take guided tour

Research & background

Try AI suggestions

Try sample data

Images

Lab tests

Shared meaning

Data exchange

Clinical terms

CONCLUSION

AI agents won't replace human inquiry or creativity.
They can multiply the scale, speed, and creative scope of every thinker in the university
and involved in Research and Discovery.

**The Future Belongs to the next generation of Intentional, Ethical
and Creative AI Architects**

Explore Demos & Syllabi: rayuzwyshyn.net

Track 1 — AI & Data Science

From first Python program to neural networks and agentic AI

Date	Time	Session	Lead
Thu, Sept. 24	9:00–10:30 am	<u>Introduction to Agentic AI: Capabilities, Personas & Possibilities</u>	<u>Ray Uzwyshyn</u>
Wed, Sept. 30	1:00–2:00 pm	<u>Studying with Gemini Notebook (UCR-licensed tools)</u>	<u>A. Zou / I. Shin</u>
Wed, Oct. 7	2:00–3:00 pm	<u>Python for Beginners Using AI</u>	<u>B. Martinez Neda</u>
Wed, Oct. 21	3:00–4:00 pm	<u>Introduction to Data Cleaning with Python, Pandas & AI</u>	<u>B. Martinez Neda</u>
Wed, Oct. 28	12:00–1:00 pm	<u>AI Literacy 101: Exploring Generative AI Through History</u>	<u>I. Shin</u>
Wed, Nov. 4	2:00–3:30 pm	<u>Introduction to Machine Learning</u>	<u>B. Martinez Neda</u>
Thu, Nov. 5	3:00–4:00 pm	<u>Web Agent: A Gemini-Powered AI Agent for Data Analysis</u>	<u>I. Shin</u>
Mon, Nov. 23	3:00–4:00 pm	<u>Intro to Advanced Machine Learning: Neural Networks (PyTorch)</u>	<u>I. Shin</u>

AI Literacy Support Services


RESEARCH SUPPORT >> AI SUPPORT SERVICES

AI Support Services

The UCR Library AI Support Services provides comprehensive support for AI integration and development across a variety of research activities. Our services include, but not limited to, guidance on AI use in research design, data collection and analysis, scholarly production and communication.

Through consultations, workshops, collaborations, and curated resources, we help researchers and students develop frameworks for using AI critically and ethically across different stages of the research lifecycle. We also support those interested in building custom AI-powered systems by leveraging university and library resources.

Areas of Support

Enhancing Research Workflows with AI

- While AI does not replace researchers, it can reduce time and effort in many parts of the research process. We help you explore where AI can support your research workflow without losing transparency, reproducibility and rigor.

Exploring and Selections of AI Tools

- We introduce available AI tools and work with you to identify tools that best fit your research goals, methods, and constraints.

Leveraging AI to Expand Research Skills

- AI tools are making research skills more accessible. In a collaboration with [the Data Services Team](#), We help researchers use AI as a learning and support tool to strengthen technical skills in areas such

Contact:



Inyoung Shin
AI Research Librarian

- [Email](#)
- [Schedule a Zoom Consultation](#)

HOW TO USE IT

- 1 Enhance research workflows with AI — without losing transparency or rigor
- 2 Explore and select AI tools that fit your goals and constraints
- 3 Build skills with the Data Services team: coding, data processing, visualization
- 4 Responsible AI: privacy, bias, authorship and compliance — plus custom AI systems

GO TO

[AI Support Services page](#)

[Book Inyoung Shin \(30 min\)](#)

inyoungs@ucr.edu

UCR AI Graduate Research Brown Bag Series






UCR AI Graduate Research Brown Bag Series

Are you a graduate student or postdoc who conducts research about AI, with AI, or on the social impact of AI?

The UCR Library, RAISE@UCR, GradSuccess, and XCITE Center for Teaching and Learning are hosting an AI Graduate Research Brown Bag Series every quarter. This is a low-stakes and supportive space where graduate students and postdocs share their research progress and receive feedback from across the UCR community.

Scope of Topics

AI Foundations Machine learning, perception, robotics, computer vision, NLP, and embodied AI.	AI Applications AI in computational science, natural and applied sciences, biology, and medicine.
Methodologies New research methodologies that incorporate AI tools.	Education Guidelines and best practices for AI use in academic programs.

Participation Benefits

Enhance Your Presentation Skills Practice for upcoming conferences, dissertation/thesis defenses, or job talks.	Build connections Meet AI researchers across disciplines including STEM & Agricultural Science, Humanities & Social Sciences, Business, Education, and Public Policy.	Build Your CV/Resume Showcase your expertise and leadership in AI research.
---	---	---

Event Details

We are hosting two presentation events in Fall Quarter 2026.

Date	Time	Format	Refreshments
Thursday, October 22, 2026 (tentative)	12 - 1 p.m.	Around 20-minute presentations followed by Q&A.	Lunch will be provided
Thursday, November 19, 2026 (tentative)	12 - 1 p.m.	Around 20-minute presentations followed by Q&A.	Lunch will be provided

Interested in Presenting?
 Submit your interest via this link:
shorturl.at/olUjG



Questions?
 Contact Inyoung Shin, PhD, AI Research Librarian:
inyoungs@ucr.edu

For grad students and postdocs doing research about AI, with AI, or on the social impact of AI.

AI foundations

ML, perception, robotics, computer vision, NLP, embodied AI

AI applications

Computational, natural & applied sciences, biology, medicine

Methodologies

New research methods that incorporate AI tools

Education

Guidelines and best practices for AI in programs

Thu, Oct. 22 & Thu, Nov. 19 • 12–1 pm • ~20-min talks + Q&A • lunch provided

Co-hosted by the UCR Library, [RAISE@UCR](#), [GradSuccess](#) and [XCITE Center for Teaching and Learning](#).



Present your work

shorturl.at/olUjG • inyoungs@ucr.edu

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shorturl.at/olUjG



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Present your work

shorturl.at/olUjG • inyoungs@ucr.edu

Data Services — From Planning to Publishing



Data Services
Provided by **UC RIVERSIDE** Library

Support for your research data — from planning to publishing.

RESEARCH DATA SUPPORT

Planning and Management • Develop Data Management Plans (DMPs) • Organize files and folders effectively	Analysis and Visualization • Clean and preprocess data • Apply machine learning (ML) methods • Create clear visualizations	Data Sharing & Repositories • Deposit data into Dryad • Ensure data is findable and reusable • Meet journal and funder requirements
---	---	--

HOW TO ACCESS THESE SERVICES

Consultations • Get one-on-one support for your data questions and needs	Workshops • Build practical skills with data and ML tools	Collaborations • Partner with us to support your research group's data needs
---	--	---

NEED HELP OR HAVE QUESTIONS? CONTACT US!
The UCR Library's Research Data Scientist Barbara Martinez Neda will be able to assist you.

Email:
barbara.martinezneda@ucr.edu

Website:
<https://library.ucr.edu/data-services>

Calendly:
<https://calendly.com/barbara-martinezneda>



Support for your research data — from planning to publishing.

Planning & management

DMPs, file organization

Analysis & visualization

Cleaning, ML methods, clear visuals

Sharing & repositories

Dryad, findable & reusable data

Collaborations

Partner on your group's data needs

DATA WORKSHOPS THIS FALL

- Python for Beginners Using AI — Wed, Oct. 7
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- Introduction to Machine Learning — Wed, Nov. 4

Book Barbara: calendly.com/barbara-martinezneda · barbara.martinezneda@ucr.edu

Data Services Across the Research Lifecycle

UNIVERSITY OF CALIFORNIA, RIVERSIDE UCR Home QUICKLINKS... Search

UC RIVERSIDE Library

HOME USING THE LIBRARY RESEARCH SUPPORT COLLECTIONS TEACHING AND LEARNING LIBRARIES ABOUT GIVING

RESEARCH SUPPORT » DATA SERVICES

Data Services

About Research Data Services

Our Data Services provide comprehensive support throughout the research data lifecycle. We assist with the development of **data management plans**, facilitate effective **data organization and analysis** during active research, and guide researchers in **data sharing and preservation** for broader academic impact

Data Management Planning

Effective data management begins before data collection. We provide guidance on creating robust [Data Management Plans \(DMPs\)](#) that outline how your data will be handled throughout your research project. A DMP is often a requirement for grant proposals and ensures the long-term integrity and accessibility of your research data. Our support includes assistance with the [DMPTool](#), a free online application that helps researchers create their own DMPs.

Data Organization

Organizing your data effectively is crucial for efficient research and accurate analysis. We offer best practices and strategies for data organization, including file naming conventions, folder structures, and metadata creation. Proper organization not only saves time during your project but also enhances the reusability and understanding of your data for yourself and others, both now and in the future.

Data Processing and Analysis

Once your data is collected and organized, the next step is processing and analysis. Our services are here to help you navigate common challenges in this phase, including guidance on best practices for data cleaning, processing and analysis.

Contact

Barbara Martinez Neda
Research Data Scientist

- [Email](#)
- [Schedule a Zoom Consultation](#)

HOW TO USE IT

- 1 Plan — Data Management Plans for grants, with DMPTool
- 2 Organize — file naming, folder structures, metadata
- 3 Analyze — cleaning, Python/pandas, machine learning, visualization
- 4 Share — deposit in Dryad; meet funder and journal requirements

GO TO

[Data Services page](#)

[Book Barbara Martinez Neda](#)

[DMPTool](#)

[Dryad](#)

Data Services — From Planning to Publishing



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Coming Soon: The STAR Lab Is Leveling Up With AI

Coming soon to UCR Library

The STAR Lab is leveling up with AI

New high-performance workstations will bring **private, local AI tools** to UCR researchers across disciplines to use in Orbach Library's Scholarly Technology and Research (STAR) Lab



What you'll be able to do

Chat with AI privately

Create your own private, ChatGPT-style experience. Run powerful **open-source models** (Llama 3, Gemma, Mistral) locally using **Open WebUI & Ollama**.

Transcribe audio offline

Turn interviews into text using **aTrain**, an offline audio transcription and speaker detection tool.

Analyze your documents

Upload PDFs or research data to ask questions across your files using the **local Retrieval-Augmented Generation (RAG) tools** built into Open WebUI.

Build & fine-tune models

Customize open-source models and code advanced AI pipelines locally with **VS Code & Anaconda**

Other specialized tools available in the STAR Lab right now:

- NVivo & Adobe Creative Suite
- Audio, video & multimedia editing
- GIS mapping & analysis
- Data analysis & visualization
- Computer-Aided Design (CAD)
- and more!

Orbach Library
Room 147



guides.lib.ucr.edu/starlab

More info is coming late summer/early fall. Visit library.ucr.edu for updates or email barbarma@ucr.edu with questions.

New high-performance workstations bring private, local AI tools to UCR researchers across disciplines.



Chat with AI privately

Open WebUI & Ollama running Llama, Gemma and Mistral locally



Transcribe audio offline

aTrain for interviews, with speaker detection



Analyze your documents

Local retrieval-augmented generation over PDFs & data



Build & fine-tune models

Custom models and AI pipelines in VS Code & Anaconda

Questions: Barbara Martinez Neda • barbarma@ucr.edu

Questions & Discussion

Ray Uzwysyn, Ph.D., MBA, MLIS
Director, Research and Technology Services
UCR Libraries
raymondu@ucr.edu · linkedin.com/in/rayuzwysyn

[Vita, apps and slides](#)

[AI writing & research archive](#)

What the loop looks like in practice



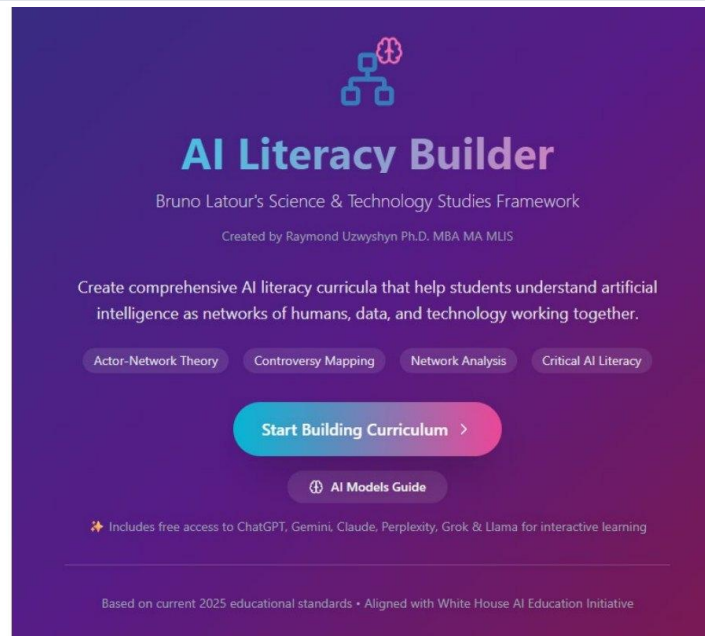
AI Literacy Builder

Anthropic AI API

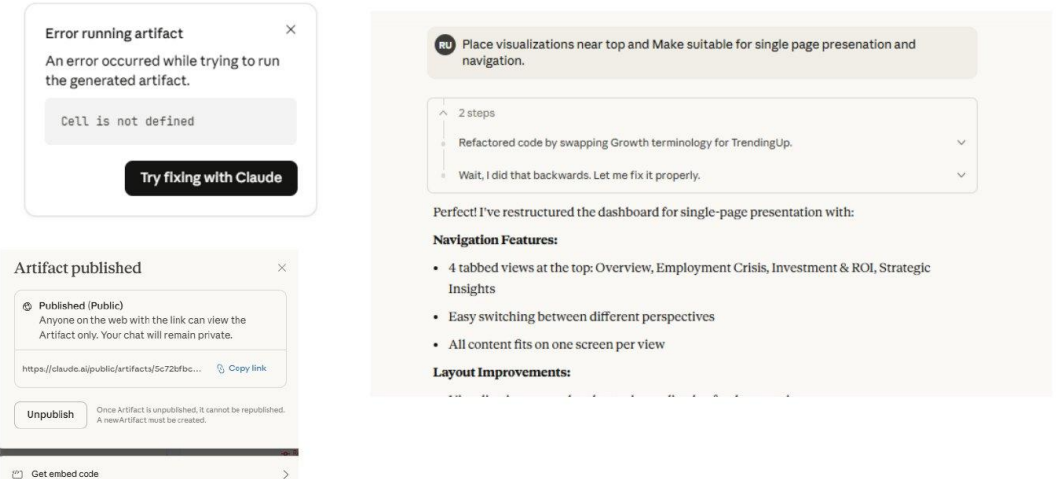
Inspired by
Bruno Latour's

Science Technology Society
Framework

<https://claude.ai/public/artifacts/da408442-9c2a-40d2-812e-39b8300f39c6>



Correcting Errors Running Artifact Repeat and Iterate Until App Achieved (7 Versions)



The result AI Literacy Builder on Latour's STS framework — a live Anthropic API app, shown at the NeurIPS 2025 education showcase.

The process Errors are normal: “Try fixing with Claude,” restate the goal, iterate — seven versions to get one dashboard right.

[Open the Latour builder ↗](#)

A gallery built this way

Click through after the session — all are live



Move 37

Discovery engine modeled on AlphaGo's creative leap

[Open ↗](#)

UC Research Starter

AI brainstorming for faculty and grad students

[Open ↗](#)

Latour AI Literacy Builder

Curriculum builder on an STS framework

[Open ↗](#)

Research Insights Architect

PRISMA systematic-review framework

[Open ↗](#)

Collider Bias

Multivariate statistics through interactive visualization

[Open ↗](#)

Graduate Employment Paradox

Fed, StatCan and UK labor data synthesized

[Open ↗](#)

Try it: your first deep-research run

Works in ChatGPT, Gemini, Claude or Perplexity — paste, edit the brackets, run



Research question: [your question].

Scope: peer-reviewed and governmental sources, [years], [regions].

Method: first propose a research plan and wait for my approval. Then search broadly, prioritize primary sources, and flag disagreements between sources.

Output: an executive summary, a findings table with a citation per claim, gaps in the evidence, and 5 suggested next questions.

Rules: never invent a citation; label anything uncertain.

Why it works

Plan-first keeps you in the director's chair.

A citation-per-claim table makes verification fast.

“Gaps” and “next questions” turn a report into a research agenda.

Where to start — at your level

Undergraduates

Run one deep-research prompt on a course topic; verify three citations by hand.

Graduate students

Write a methods-advisor persona; have it critique your proposal draft.

PhDs & postdocs

Vibe-code a small tool for your data; add one API call that reasons.

Staff

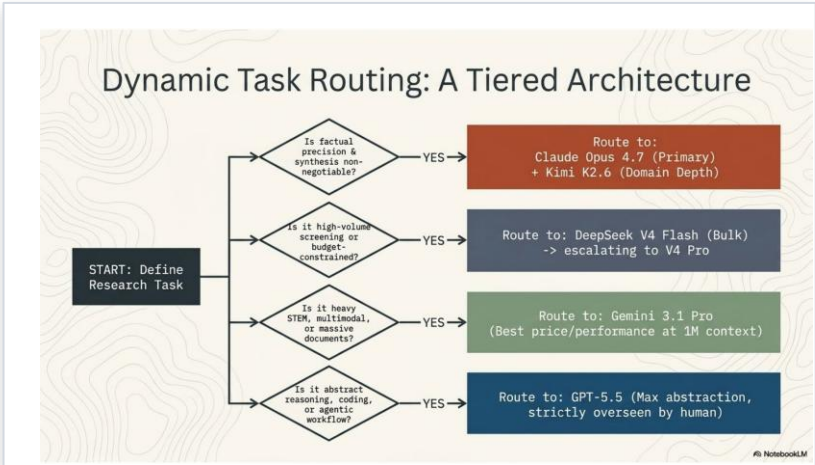
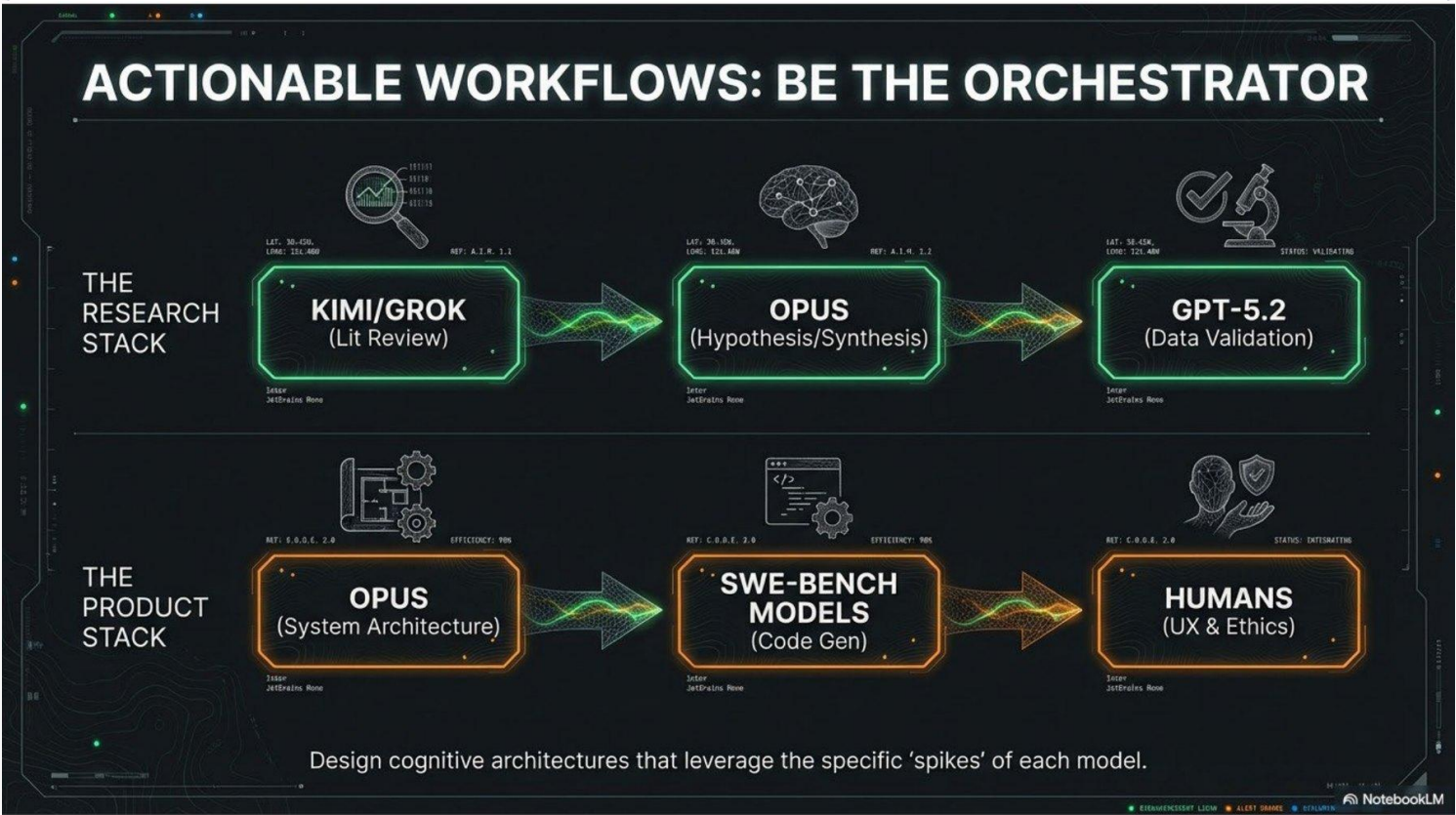
Automate one recurring spreadsheet or slide task; compare two models.

Be the Orchestrator, Producer or Director

Model selection is the new information literacy



Don't ask which model is smartest — ask which meets your specific task needs



Be the orchestrator: chain models by strength — the pattern behind the Invisible Mile project later in this talk.

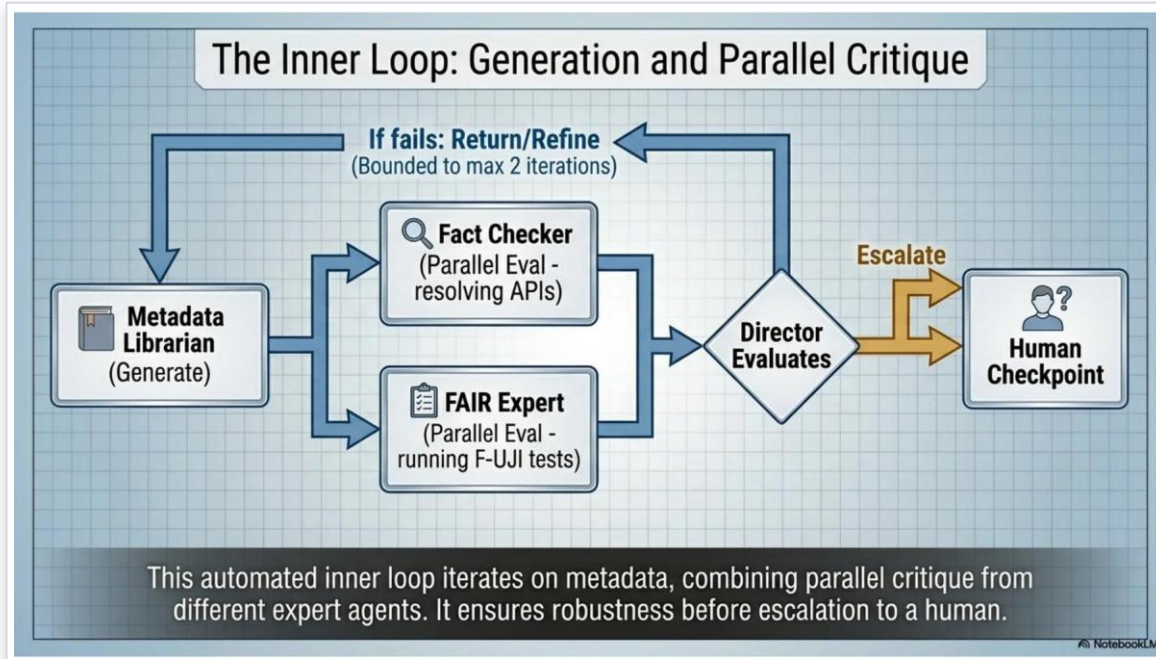
Six roles with explicit responsibilities

Persona	Contribution	Evidence to inspect
Research Librarian	Clarifies purpose and context	Structured intake brief
Director	Coordinates the workflow	Plan and escalation decisions
Metadata Librarian	Drafts descriptions and mappings	Record and crosswalk
Fact Checker	Checks identifiers and claims	Verification results
Quality Reviewer	Examines reuse requirements	Pass, warning, or failure
Recorder	Preserves the history	Provenance log

Roles describe intended responsibilities. A demo can simulate their outputs.

How the Research team works

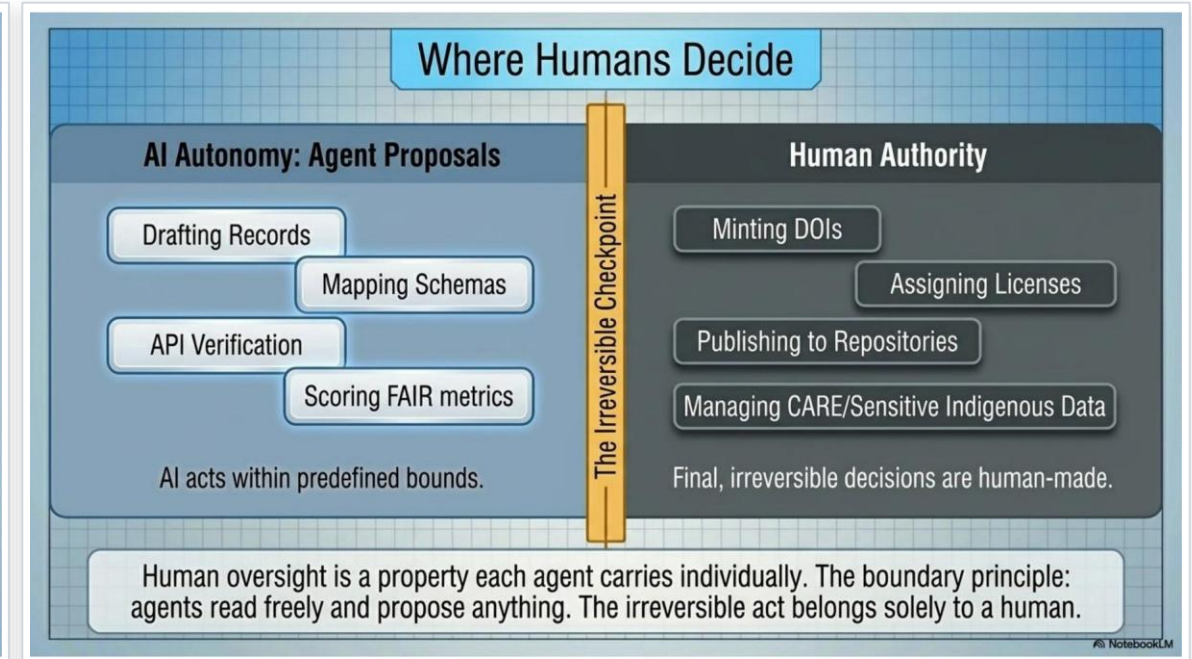
Where Agentic AI and Where humans decide



Architecture illustration from the Research Data Director presentation

Shared Context and a Review Loop

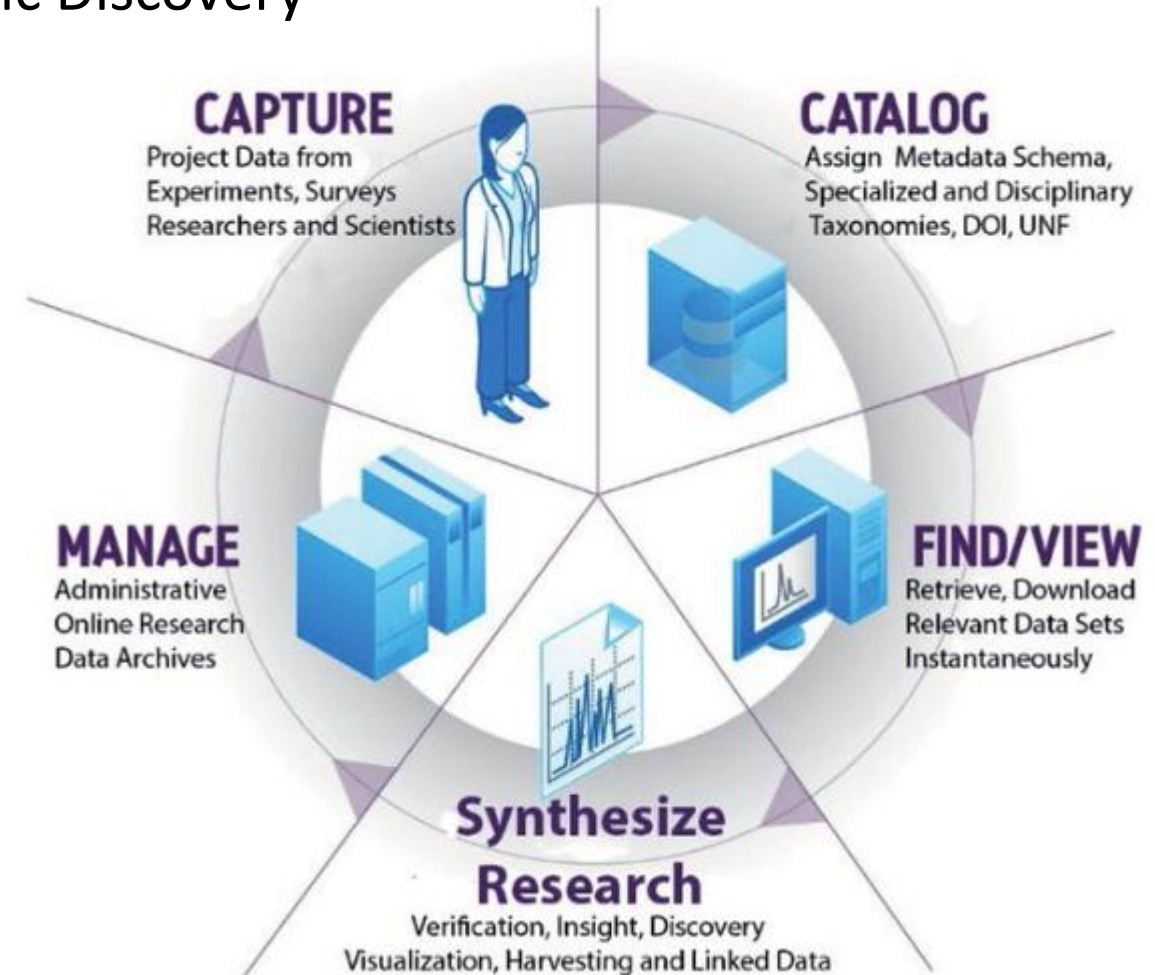
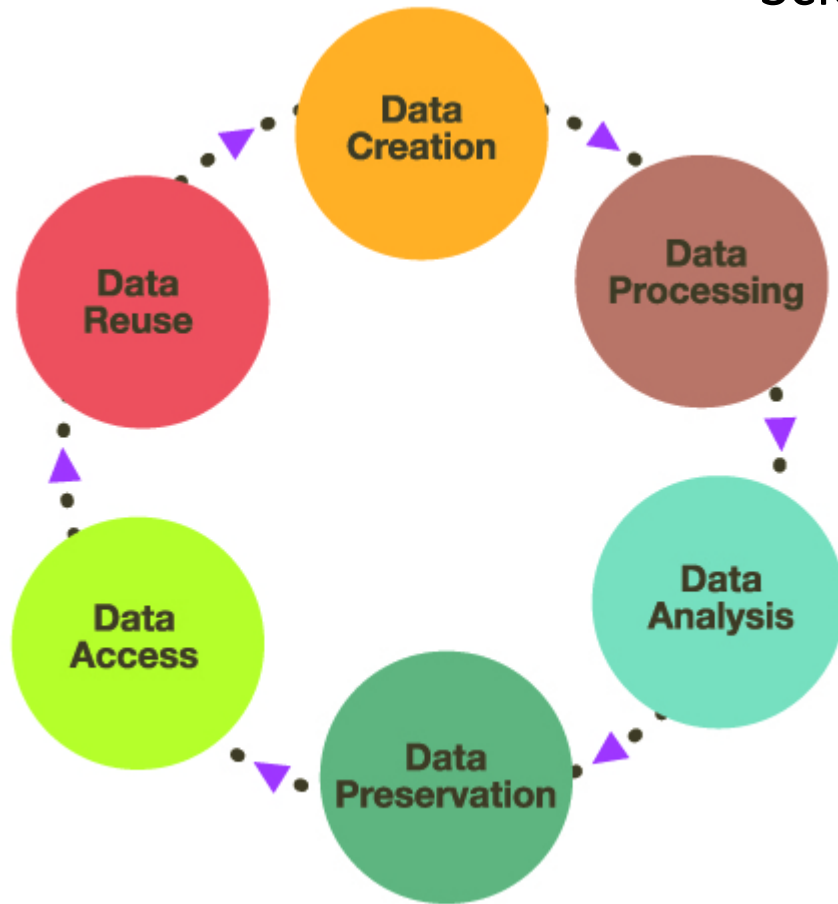
Inner loop The Metadata Librarian generates; the Fact Checker and FAIR Expert critique in parallel; the Director decides — at most two rounds before Human escalation.



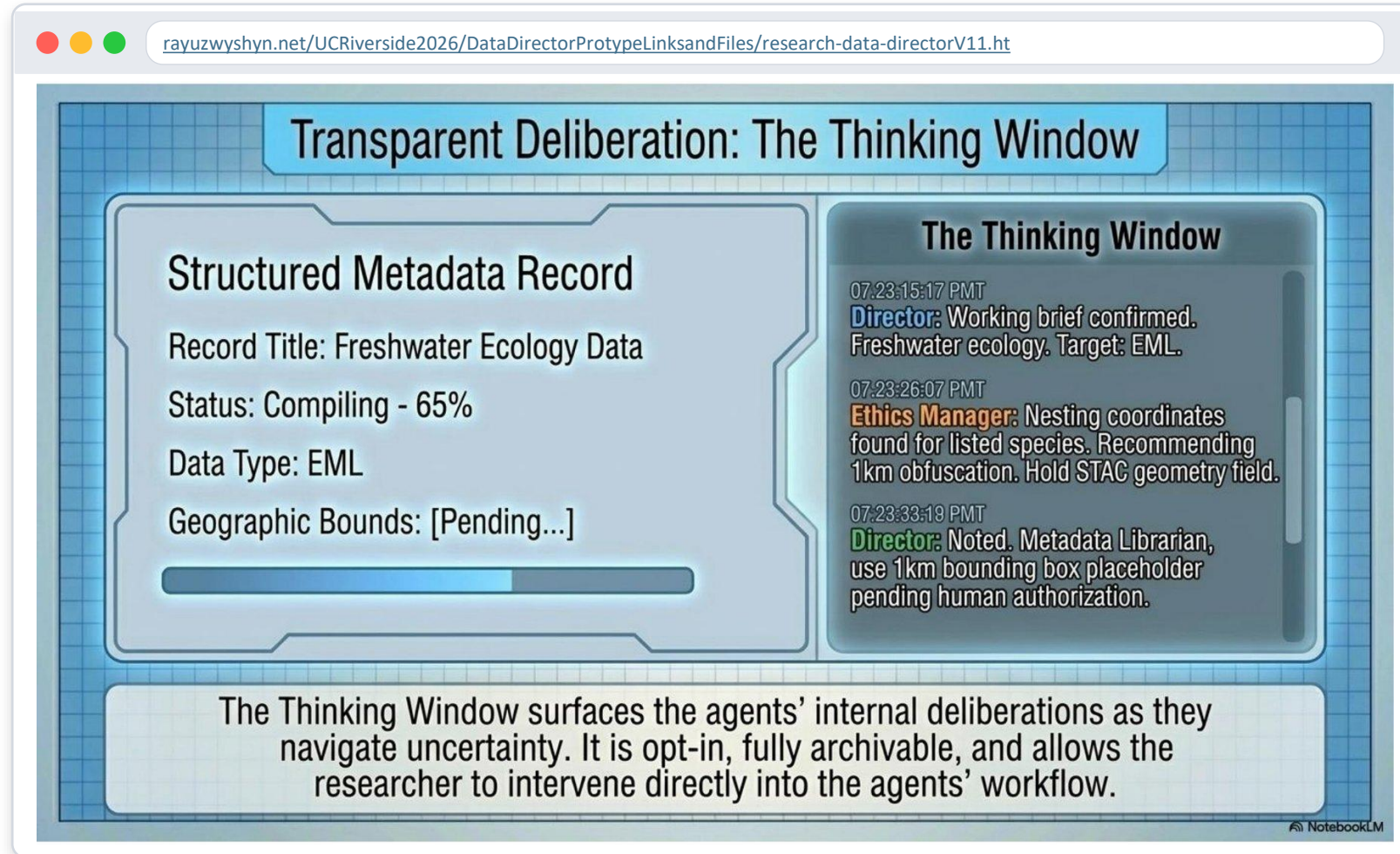
Irreversible checkpoint Agents draft, map and score. Humans mint DOIs, assign licenses, publish, and govern sensitive data.

The Research Data Lifecycle & the Scientific Process, Scientific Discovery

Data Integrity, Findability, Access, Interoperability, Reproducibility (FAIR Principles)
US and International Grant Compliance, Publication, Sharing, Collaboration, Automation
Data, Metadata, Metadata Schema, **Metadata Mappings and Crosswalks** and Data and Scientific Discovery



Demo: watch the team work



The thinking window: persona deliberations, opt-in and archivable

What to watch

- The Director plans before anyone acts
- Hand-offs between personas
- The opt-in thinking window
- Where a human approves the deposit

Poster at RDA P27, London — October 2026

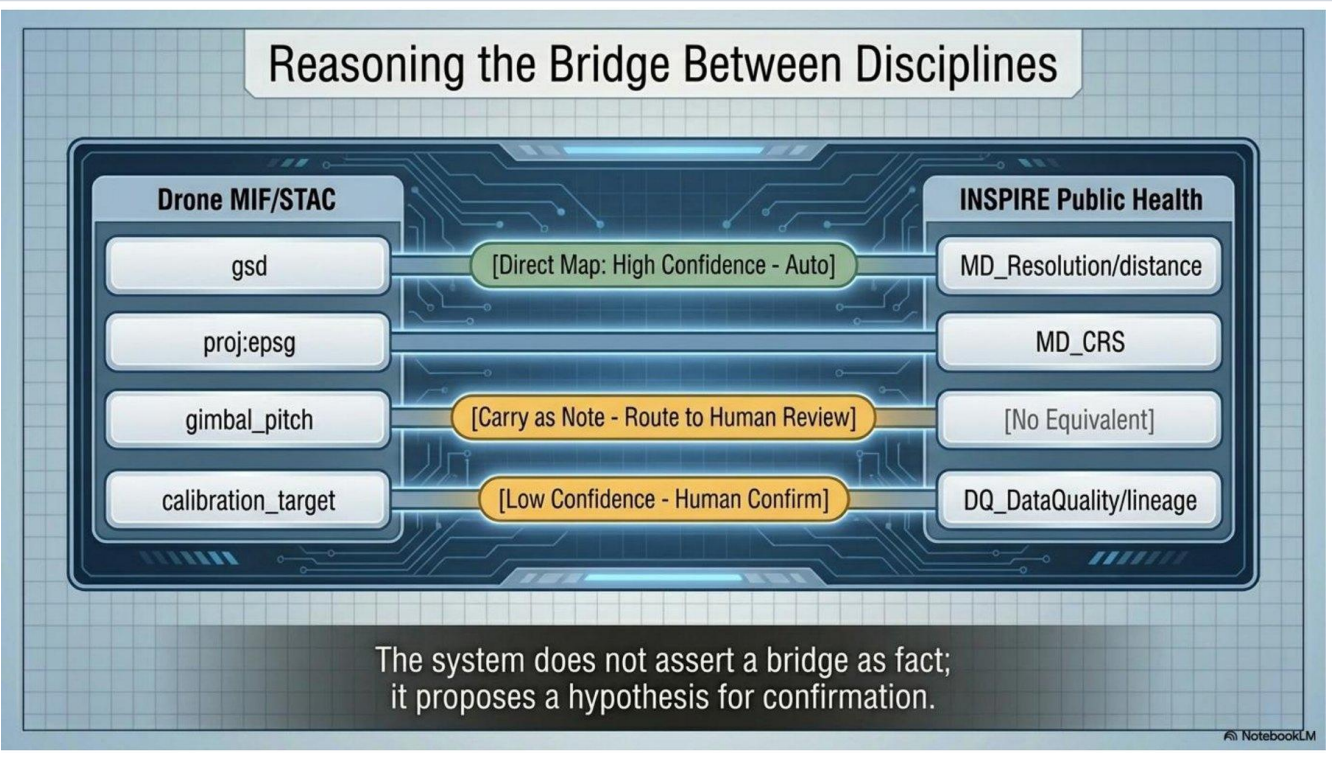
[V10 persona build](#)

[V5 API build](#)

[V1 friendly UI](#)

Biomedical Variant: a capabilities lens

Biomedical Metadata & Crosswalk Studio — RDA VANTAGE Working Group, August 2026



Crosswalk logic: auto-map high confidence, route the rest to human review

[Open the Biomedical Crosswalk Studio ↗](#)

- Register
- Multimodal datasets: imaging, genomics, sensors
- Normalize
- Metadata cleaned to shared vocabularies
- Assess
- Provenance and quality scoring
- Crosswalk
- AI assistant proposes mappings; humans review
- Export
- FHIR ConceptMap, crosswalk and research manifest

DICOM • LOINC • SNOMED CT • RadLex / PI-RADS • UCUM • FHIR

[Blueprint](#)

[Research background](#)

Questions & discussion

[Vita, apps and all slides](#)

[Jagged Frontier: slides + paper](#)

[Research Data Director blueprint](#)

[Biomedical Crosswalk Studio](#)

[Invisible Mile atlas](#)

[AI writing & research archive](#)

Ray Uzwyshyn, Ph.D., MBA, MLIS
Director, Research and Technology
UCR Libraries

raymondu@ucr.edu · linkedin.com/in/rayuzwyshyn

Personas as job descriptions



Each agent: a professional analogue, an output, and a trigger for human escalation

The Six Core Agents

AI Agent Name	Professional Analogue	Core Output	Trigger for Human Escalation	Under-the-Hood LLM Pattern
Research Data Director	Head of Data Services	Dispatch plan & gates	Irreversible acts (DOI minting)	Orchestrator
Research Data Librarian	First-Contact Intake Specialist	Working Brief (JSON)	Sensitivity/Privacy flags	Sequential Intake
Metadata Librarian	Senior Cataloger	DataCite/EML/DDI Record	Low-confidence schema mappings	Generator
Fact Checker	Research Integrity Specialist	Verification API Report	Unresolvable external APIs	Evaluator (Parallel)
FAIR Expert	FAIR Assessor	F-UJI Metric Score	Sub-threshold FAIR scores	Evaluator (Parallel)
Provenance Recorder	Digital Archivist	PROV-O Audit Log	(None - ambient listener)	Continuous Audit

NotebookLM

- The persona prompt is the role: Head of Data Services, Senior Cataloger, Digital Archivist
- Escalation triggers are written into each persona
- LLM patterns: orchestrator, generator, parallel evaluators, continuous audit

Open Problems, Possibilities, Challenges For Agentic AI

Guardrails for Agentic AI Work, Transparency, Understanding

Verification

Agents hallucinate with confidence. Check and Verify sources, numbers and code.

Protect data

No FERPA, HIPAA or unpublished data in consumer tools — use UC-approved platforms.

Humans in the loop

Put human approval where consequences are real. Governance, The Human Use of Human Beings,

Disclose

Say how AI was used, transparency of results following course and publisher policy.

Sensitive Data, Privacy, Security Governance