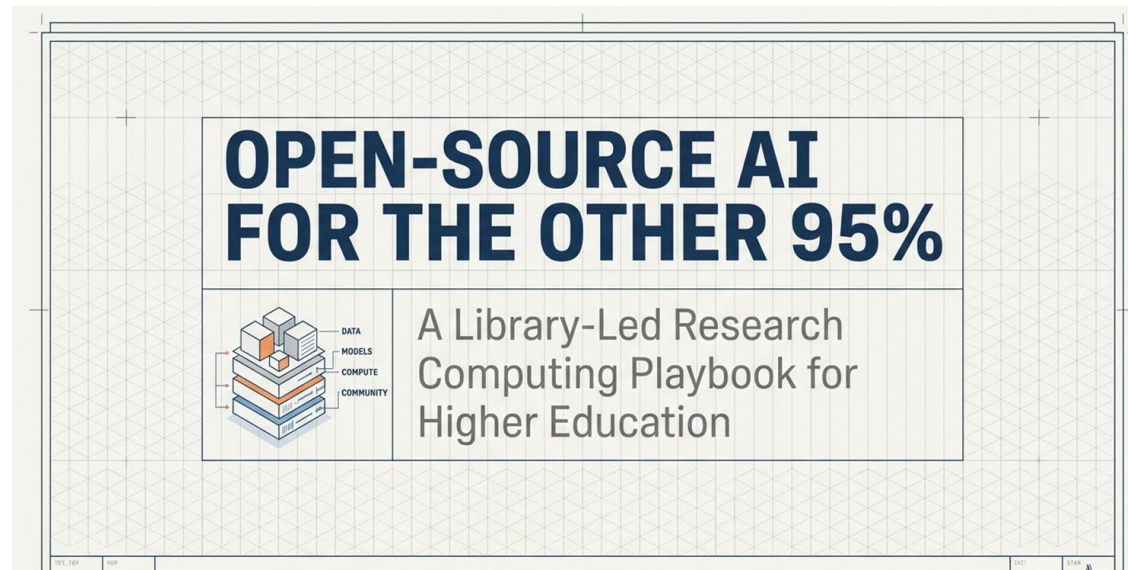


Deep Research and Open Source AI For the Other 95%

A Research Services Library Led, AI Literacy, Research Computing Model



OPEN-SOURCE AI FOR THE OTHER 95%

A Library-Led Research Computing Playbook for Higher Education

DATA
MODELS
COMPUTE
COMMUNITY

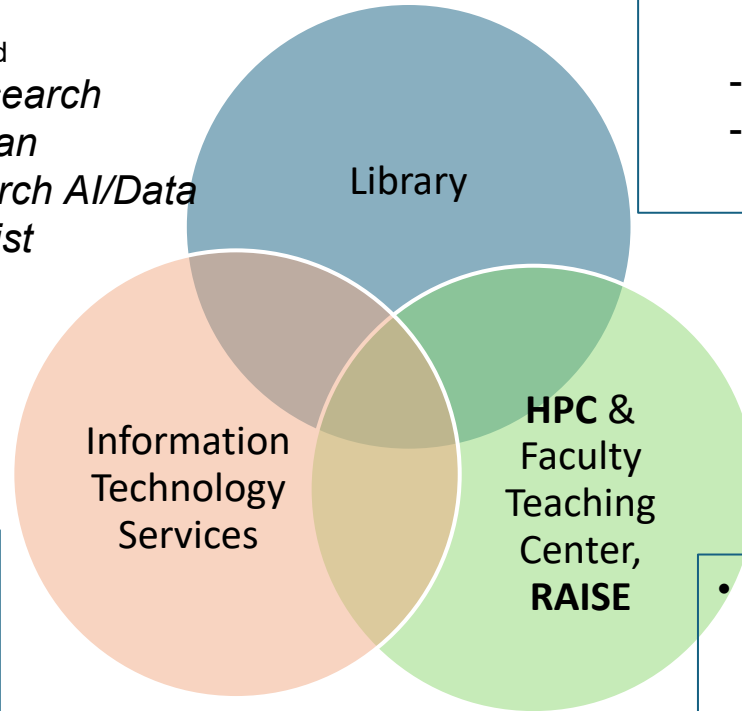
Presented for: RCSI Research Computing for Smaller Institutions, June 2026, Swarthmore College



Ray Uzwyshyn, Ph.D. MBA MLIS
Acting AUL for Research & Technology &
Director of Research Services
University of California Riverside Libraries,
raymondu@ucr.edu, <https://rayuzwyshyn.net>
<https://www.linkedin.com/in/rayuzwyshyn/>

AI Infrastructure Support at University of California Riverside

Dedicated
*AI Research
Librarian
Research AI/Data
Scientist*



- **AI Literacy, Faculty, Student & Researcher Support**

- [Use of AI tools in research](#)
e.g., research design, data collection analysis
- [Data management](#)
- Model training for regular size datasets

- **University Wide AI Proprietary Licenses**
(Google Gemini, Limited OpenAI, Anthropic)
- Broad general training
- Security

- **High Performance AI Research Compute,**
Top 2-5%, Major Grant Support Costs Involved)
Instructor Development,

UCR Libraries Research and Technology Services

Orbach Science Library

Director of Research & Technology Services

AI Research Librarian (+1)

AI/Data Research Scientist (+1)

**Cyberinfrastructure
(Core Libraries IT Infrastructure)**

Innovative Media Librarian

Digital Scholarship Librarian

Geospatial Information Systems Librarian

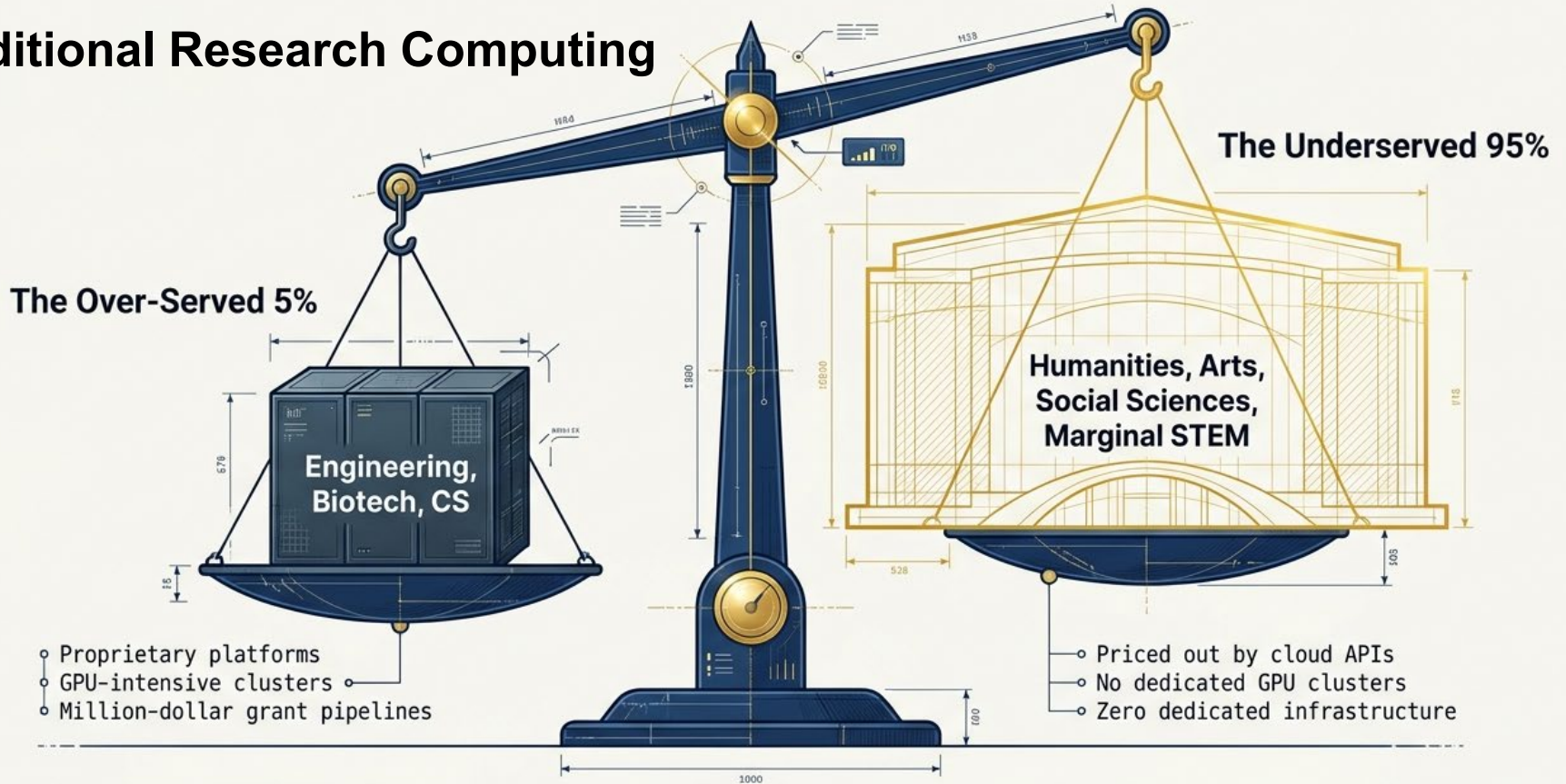
Medical & Clinical Outreach Librarian

Maker Space/Robotics Lab Services Coordinator

Research Services Information Assistant



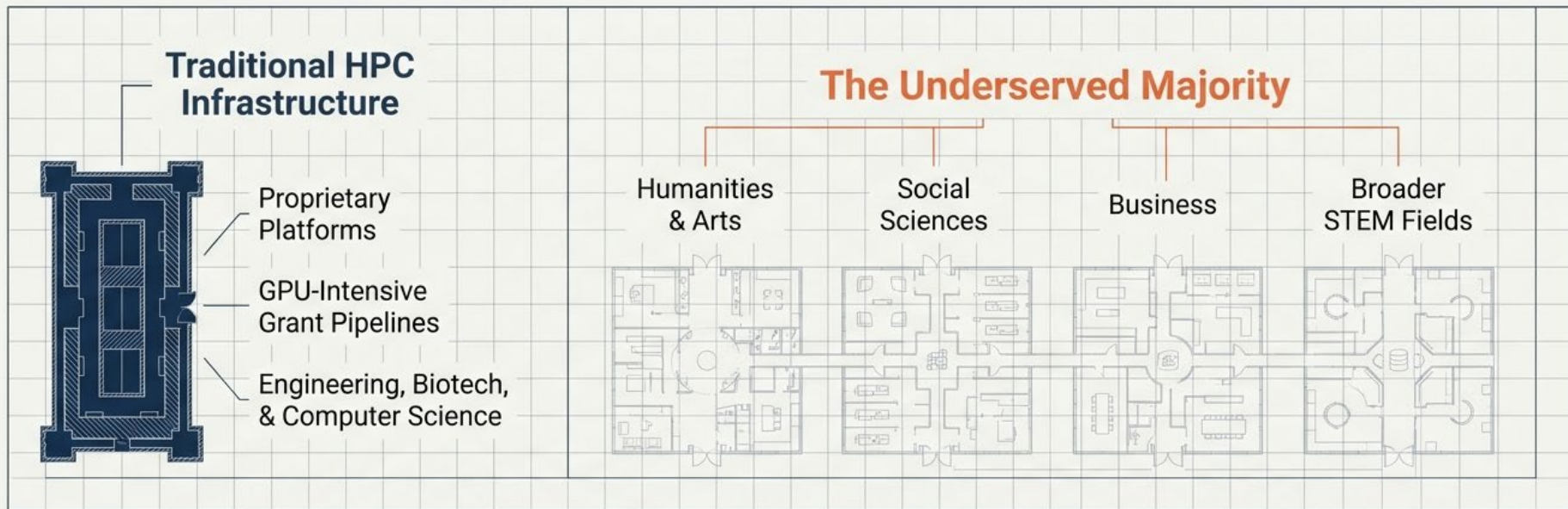
Traditional Research Computing



The question for smaller institutions is not whether to engage AI, but how to do so without the budgets or grant infrastructure that proprietary models presuppose.

The Chasm in Academic Computing

The Widening AI Divide



STRATEGIC IMPERATIVE

For **mid-sized universities** and liberal arts colleges, the question is not whether to engage AI, **but how to do so without the massive budgets, GPU clusters, or grant infrastructure** that proprietary models presuppose.

The Paradigm Shift in Academic Computing

Dimensions	<u>Traditional HPC Model</u>	<u>Library-Led AI Model</u>
Target User	Top 5% Grantees	The Other 95% Campus-wide ✓
Funding Model	Grant-dependent	Institutional / Library core budget ✓
Technology	Proprietary / Cloud APIs	Open-Source / Local Execution ✓
Disciplines	CS & Hard Sciences	Humanities, Arts, Social Sciences, Business ✓
Support Architecture	IT-driven provisioning	Librarian & Data Scientist literacy ✓

Staffing the AI Ecosystem

AI Research Librarian

Focuses on AI literacy in anterior programming, interdisciplinary workshops, and qualitative integrations.

Data Research Scientist

Focuses on Python, R, complex data modeling, and machine learning architectures.

Workshops

Building practical skills (e.g., Intro to Python, Open Data Publishing).

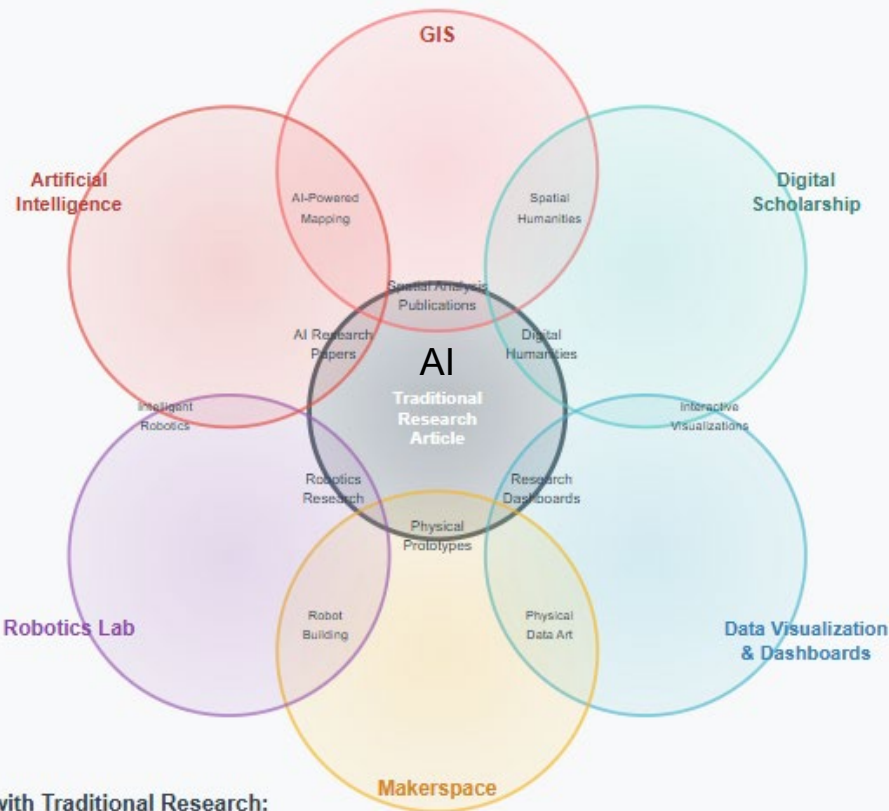
Consultations

1-on-1 support for specific research data questions.

Collaborations

Long-term partnerships with faculty research groups.

Research Approaches Centered on Traditional Research Articles



Key Intersections with Traditional Research:

- **GIS:** Geographic and spatial analysis papers, cartographic studies
- **Digital Scholarship:** Computational humanities, digital archives research
- **Data Visualization:** Research dashboards, academic infographics

- **Makerspace:** Research prototypes, experimental apparatus
- **Robotics Lab:** Robotics research publications, technical papers
- **Artificial Intelligence:** AI/ML research papers, algorithmic studies

UCR Library
Research &
Technology
Services

Several Units

Several Technologies

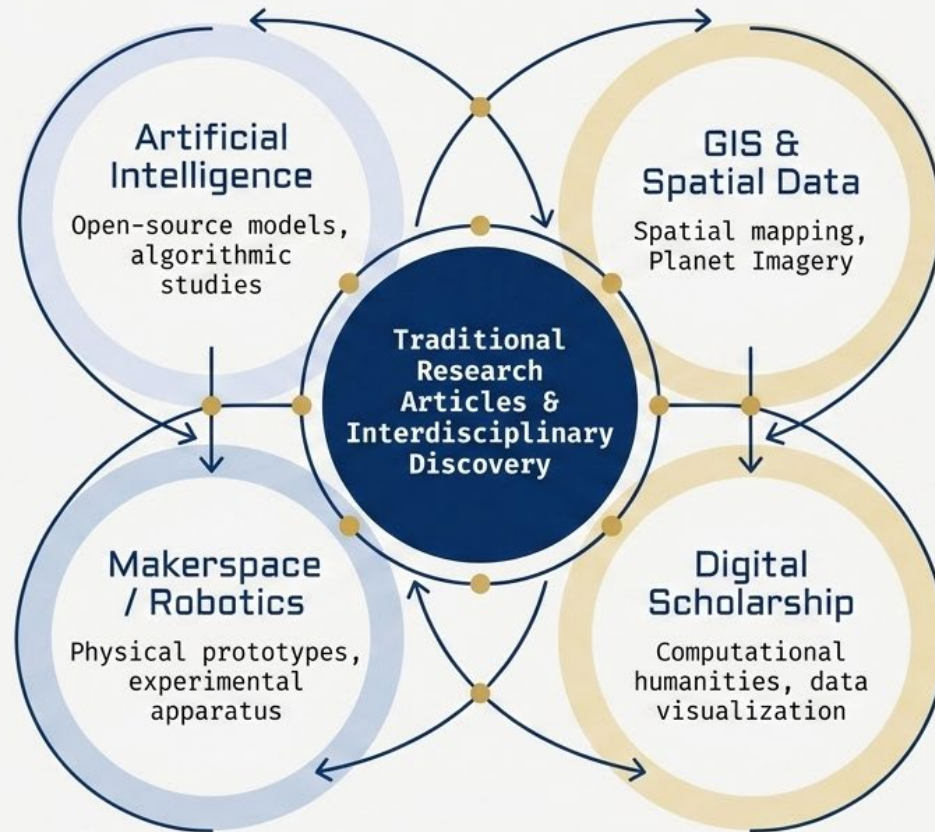
Traditional Research

Article, Monograph

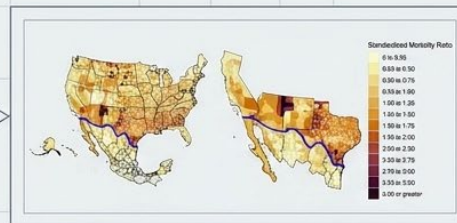
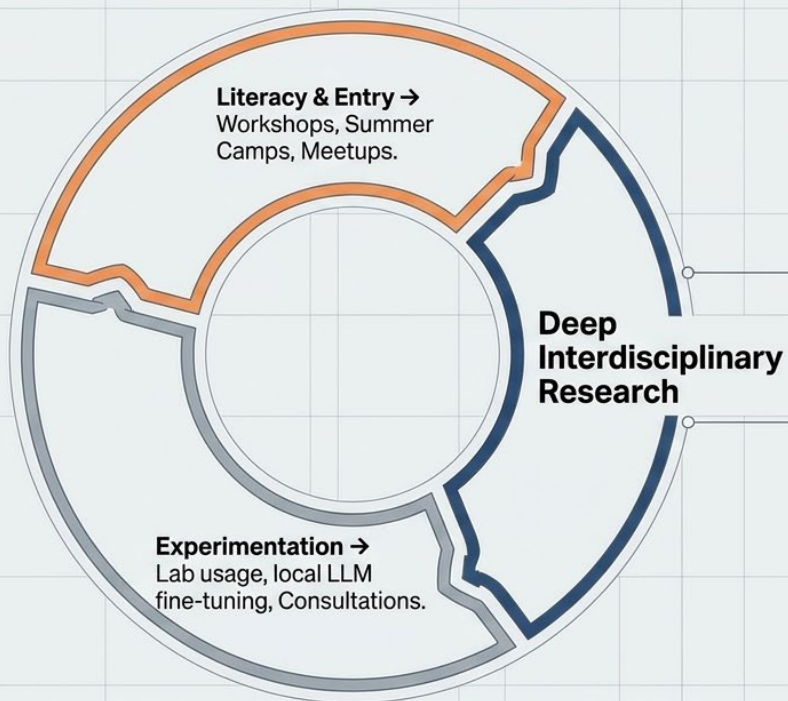
Increasingly Focused

on AI Literacy

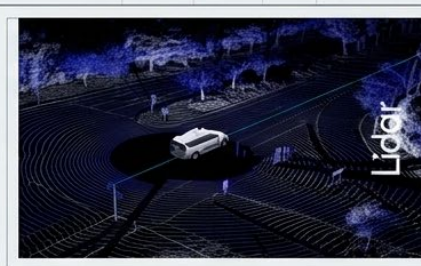
The Library as the Interdisciplinary Hub



Ecosystem Flywheel



COVID Border GIS Project: Utilizing AI/GIS for cognitive cartographies of mortality data.

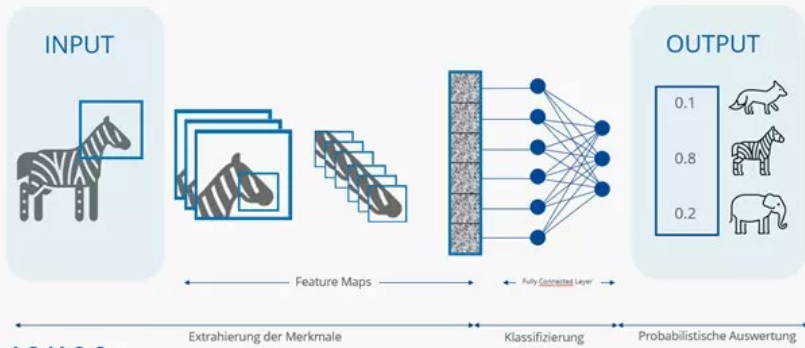


Self-Driving Vehicle LIDAR: AI metadata labeling and 3D data visualization for computer engineering.

AI Enhanced Robotics Summer Camp

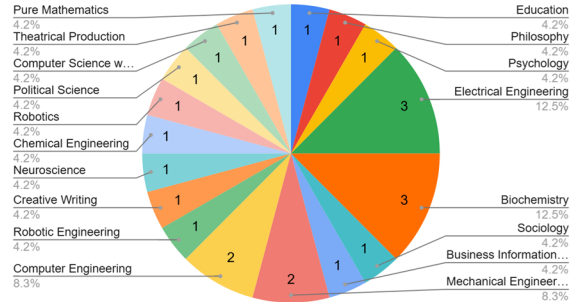
LAB Workshops: From Zero to Hero

CONVOLUTIONAL NEURAL NETWORK (CNN)



IONOS

Major & Concentration



• An AI training method, which teaches the model to recognize items based on an image

• Convolutional Neural Nets Integrated with Robotics

• Students were taught how to train the model and how to use the model in a real application

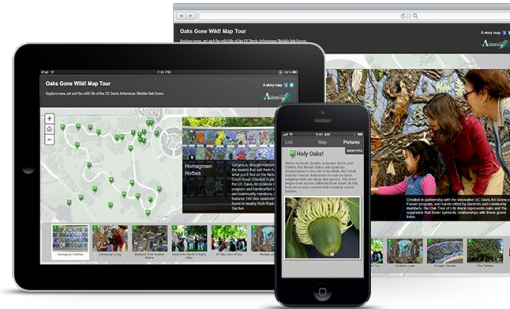
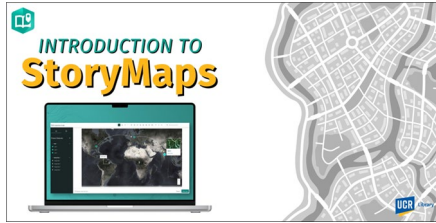


75% Female Attendees



Geospatial Information Services

AI + GIS, Planet Imagery Day



Dr. Nan Li, UCR Environmental Sciences

Dr. Nicolas dos Santos, UCR Computer Science

Planet Imagery Day is supported by USDA-NIFA's Artificial Intelligence for Sustainable Agriculture project

In a collaboration with the Artificial Intelligence for Sustainable Agriculture (AI4SA) project, the library hosted Planet Imagery Day on May 2, 2025. The event featured presentations regarding using Planet imagery in Google Earth Engine and in ArcGIS products, given by staff from Planet and Esri respectively.

Library Workshops for Researchers

(FY25/ 26 Samples)

- Introduction to Machine Learning
- Introduction to Gemini API: How to customize AI models
- Exploring AI Literature Mapping Tools (Natural Language Processing)
- Finding and Using Imagery in a GIS, Arc GIS and AI, Drones &GIS
- Data Cleaning for Machine Learning with Python
- AI Computational Methods with Text Analysis
- AI Deep Research Models/AI Video
- Introduction to Deep Learning with PyTorch
- Open scholarship / open access publishing

Contact:

Raymond Uzwyshyn, *Director of Research Services/ Acting Assistant University Librarian for Research and Technology, UCR Library*



March 2025.

<https://www.researchgate.net/publication/389558789> Harnessing AI For Research 2025 GenAI Large Language Model Introduction AGI and Reasoning Models Multimodal Models and Deep Research with Autonomous Agents

May 2025.

<https://www.researchgate.net/publication/391739383> Deep Research AI Tools For Research and Discovery

November 12, 2025.

<https://www.researchgate.net/publication/397584324> Vibe Coding For AI-Driven Development An Introduction for Research and Learning

Digital Scholarship Certificate

AWARDED BY  RIVERSIDE Library

EXPAND YOUR RESEARCH SKILLS IN DIGITAL METHODS AND TOOLS

How to Earn Your Certificate:

Undergraduate students

- Complete at least 3 workshops

Graduate students, faculty, and early-career researchers

- Complete at least 5 workshops

Workshops may be chosen from either the **Graduate** or **Undergraduate** track, and can be completed in person or on Zoom.

Enroll in our Canvas course to complete guided assignments and track your progress toward certification

Design and complete a capstone project that demonstrates your applied digital scholarship skills

Workshops Offered:

- **Orientation:** Digital Scholarship Workshop Series (Sept 11)
- **Grad:** Building a Digital Research Portfolio Using No/Low Code Tools (Sept 18)
- **Grad:** Digital Scholarship Project Types and Best Practices (Nov 20)
- **Grad:** Computational Methods on Text Analysis (Jan 22)
- **Grad:** Qualitative Data Analysis & Tools (Feb 12)
- **Grad:** Introduction to XR Design and 3D Experiences (Mar 5)
- **Grad:** Building Your Academic Profile Online (Apr 23)
- **Grad:** Navigating Open Access Repositories & Publishing with eScholarship (Apr 30)
- **Undergrad:** Building a Digital Research Portfolio Using No/Low Code Tools (Oct 9)
- **Undergrad:** Digital Scholarship Project Types and Best Practices (Nov 13)
- **Undergrad:** Building 2D Online Exhibits: Omeka and More (Feb 5)
- **Undergrad:** Introduction to XR Design and 3D Experiences (Feb 26)



Ready to get started? Contact Jing Han (jjingh@ucr.edu) or **scan the QR code** to self-enroll on Canvas or visit elearn.ucr.edu/enroll/3XMY8L.

AI Research Orientation to Technology Workshops and Faculty, Student AI Related Research

Meetups, Thematic Weeks, Presentations



Geospatial/GIS Meetups

Thu, Oct 17, 2024 12pm to 12:50pm

Rivera Library (or over Zoom),
Room 140

Stream Available

Free

SATURDAY, NOVEMBER 23



Raspberry Pi Jam: Intro to Raspberry Pi and...

Sat, Nov 23, 2024 2pm to 3pm

Orbach Library, Room 122

FREE

TUESDAY, FEBRUARY 11



UC Love Data Week

Tue, Feb 11, 2025

Virtual Event

Free

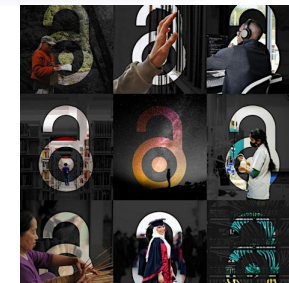
Data, AI,
Open Access
Global North and
South Presentation

Streaming Party
For Faculty
Students and Staff



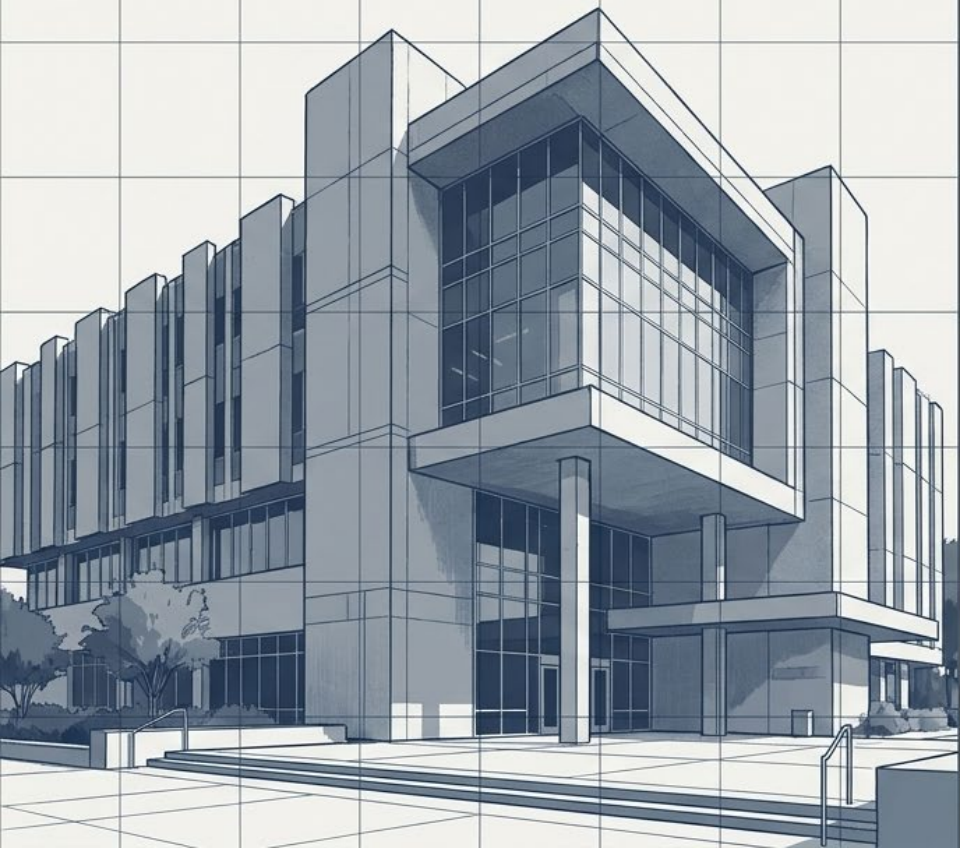
AI Research
Faculty
Presentations

AI/Robotics
Training Kits
Workshops



International
Open Access Week

Distant Viewing:
Open-Source AI
Toolkit for
Analyzing Visual
and Multimodal
Collections



The Library as the Great Equalizer

The Orbach Science Library STAR Lab transformation provides a blueprint for a vendor-neutral, accessible AI environment.

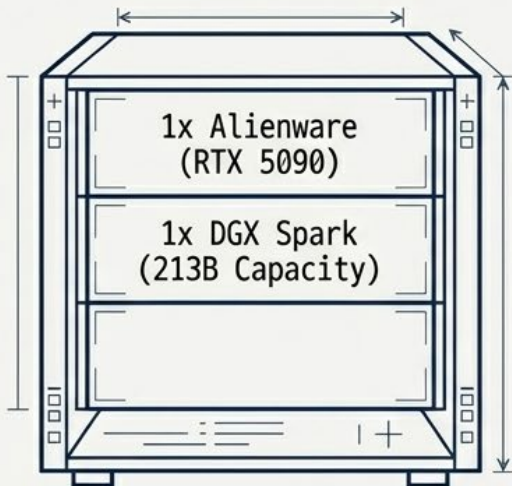
- 1. Locally Hosted:** Eliminates recurring subscription and API costs.
- 2. Open-Weights Models:** Access to frontier non-proprietary models.
- 3. Universal Access:** Designed for the entire university research community, regardless of grant funding.

Hardware Tiers for Any Institutional Budget

Option 1: Baseline Lab

The Starter Kit

~\$27,000 | 2 Workstations

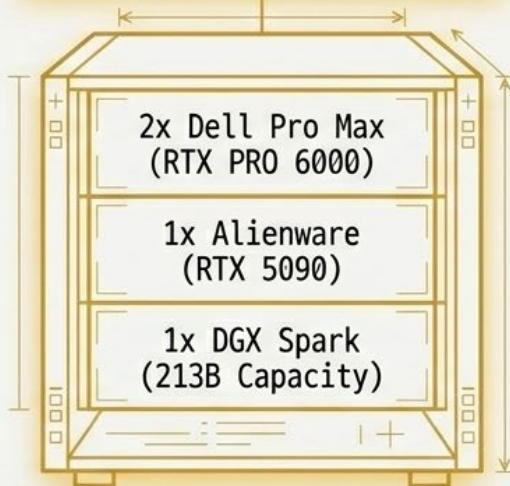


Best For: Departmental pilots

Option 2: Targeted Expansion

The Sweet Spot

~\$72,800 | 4 Workstations



Best For: Mid-sized campus hubs

Option 3: Comprehensive

The Full Vision

~\$124,800 | 8 Workstations



Best For: Full-scale research centers

If a Bigger Lab Needed, Scale: (Option #3 x 2) = Double or Triple Size

[Full Lab Project Specs](#)

Infrastructure in Action: Interdisciplinary Deep Research

Hardware:

Dell RTX
Workstation

Software:

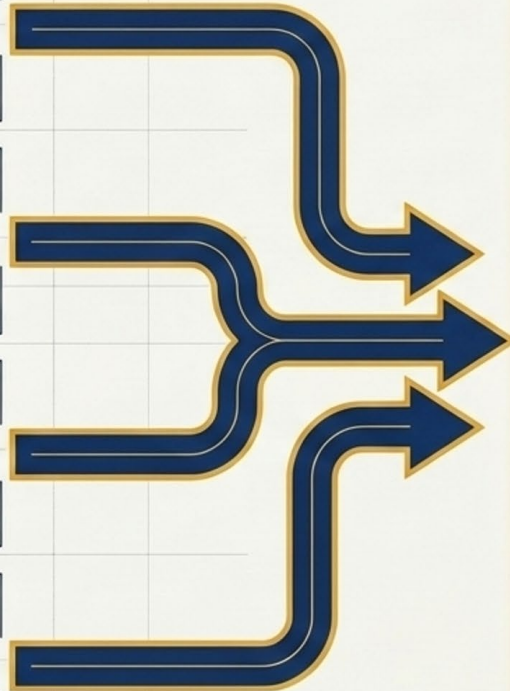
Local DeepSeek R3
for Software et al.

Support:

Data Scientist
Consult

Researcher:

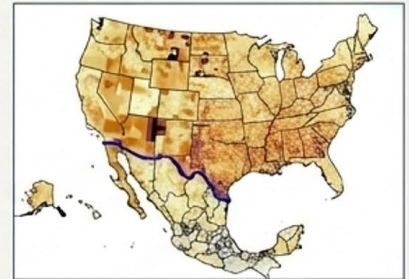
Engineering,
Social Sciences,
and Medicine



Tangible Research Outcomes

A. COVID Border GIS/AI Project

Mapping mortality
using statistical
qualitative data
and AI insights.



B. Autonomous Vehicle LIDAR

3D data storage
and visualization
of metadata for
computer
engineering.



The Model Ecosystem: Proprietary vs. Open-Weight



Proprietary / Cloud Models

High recurring API costs, opaque usage.

Reasoning: GPT 5.5 / Opus 4.8 / Mythos

Multimodal: Gemini Deep Research, GPT 5.5, Gemini 4, Grok 3



Local Lab Open-Source Roster

Zero recurring fees, complete local control.

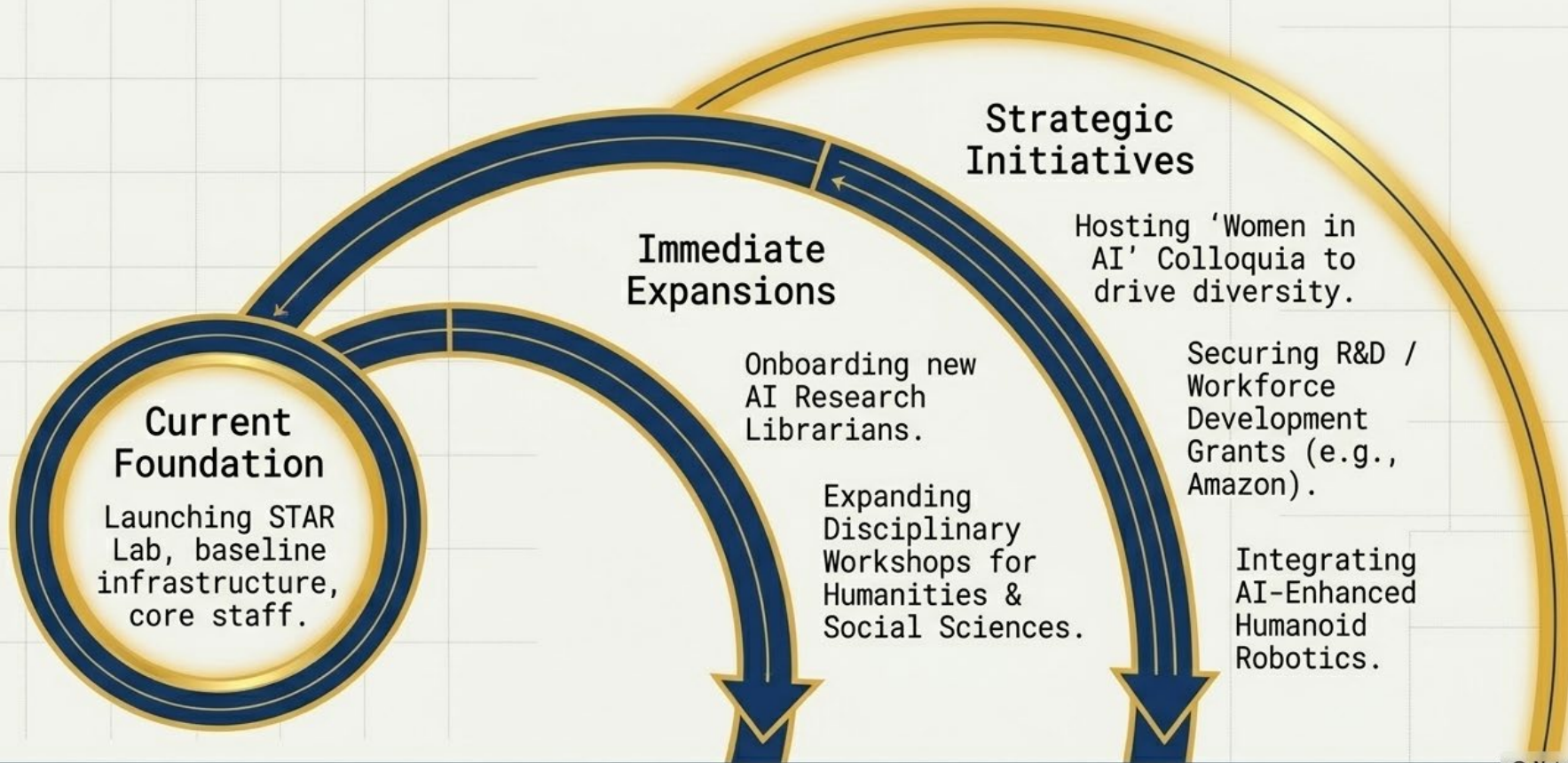
Deep Reasoning: DeepSeek R3

Multimodal: Kimi K2, Llama 4

Real-World Utility: Qwen3 Family & Gemma

Lightweight Versatility: LiquidSky, Neomotron

Future Expansion & Scaling (2026-2027)



Thank you for Attending!

Comments and Questions

Ray Uzwyshyn, Ph.D. MBA MLIS

Acting AUL for Research & Technology Services
University of California, Riverside Libraries,

raymond@ucr.edu

<https://www.linkedin.com/in/rayuzwyshyn/>

<https://rayuzwyshyn.net>

Further AI Related Library and Research Computing AI/Data Resources

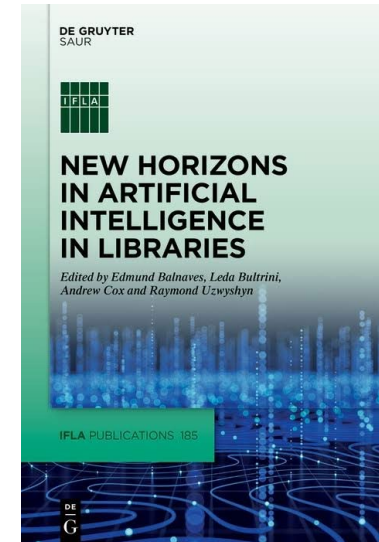
UCR Research Services. [Star Lab AI Lab Transformation Planning Document](#). June 2026.

[Uzwyshyn, R. Reimagining Education In the Age of AI: From Information Scarcity to Abundant Intelligence. \(CXO Print Edition\)](#). Education Technology Insight. 2025.

Uzwyshyn, R et al. New Horizons in AI for Libraries (Editor). [Open Access Online Version PDF](#), [Print Cover](#) [Section Introduction: Projects in Machine Learning and Natural Language Processing in Libraries \(Proof\)](#) ([Glossary Proof](#)) IFLA Publication Series. ([Online Open Access Version](#)) Walter De Gruyter (GmbH): Berlin January 2025.

[Building Library AI Infrastructures: Research Data Repositories, Scholarly Ecosystems and AI Scaffolding \(Draft\)](#). *New Horizons in AI for Libraries*. De Gruyter: Berlin, January 2025.

[From Open Science and Datasets to AI and Discovery](#). *Trends and Issues in Library Technology*. IFLA IT Section. January 2023.



Presentations, Publications

<https://rayuzwyshyn.net>

<https://www.linkedin.com/in/rayuzwyshyn/>

The question is no longer who gets to use AI, but what our institutions will discover when everyone can.

Early 2027 (Curriculum Expansion)

Integration of disciplinary AI workshops spanning Humanities, Social Sciences, and STEM.

Late 2027+ (Institutional Impact)

Serving the Other 95% at scale, driving workforce development, and establishing a national ARL prototype.

Fall 2026 (Soft Launch)

Activation of Orbach Rm 148, baseline open-source model deployment, initial grad student pilot testing.

Mid 2027 (Ecosystem Growth)

Launch of the Women in AI Colloquia and expansion into AI-enhanced humanoid robotics.

AI Literacy: The “Zero to Hero” Pipeline

Entry & Exposure

Raspberry Pi Jams,
AI/GIS Meetups,
Streaming Parties.

Goal: Low-barrier
entry for all.



Skill Building



Digital Scholarship
Certificate, Intro
to Python for Data
Analysis.

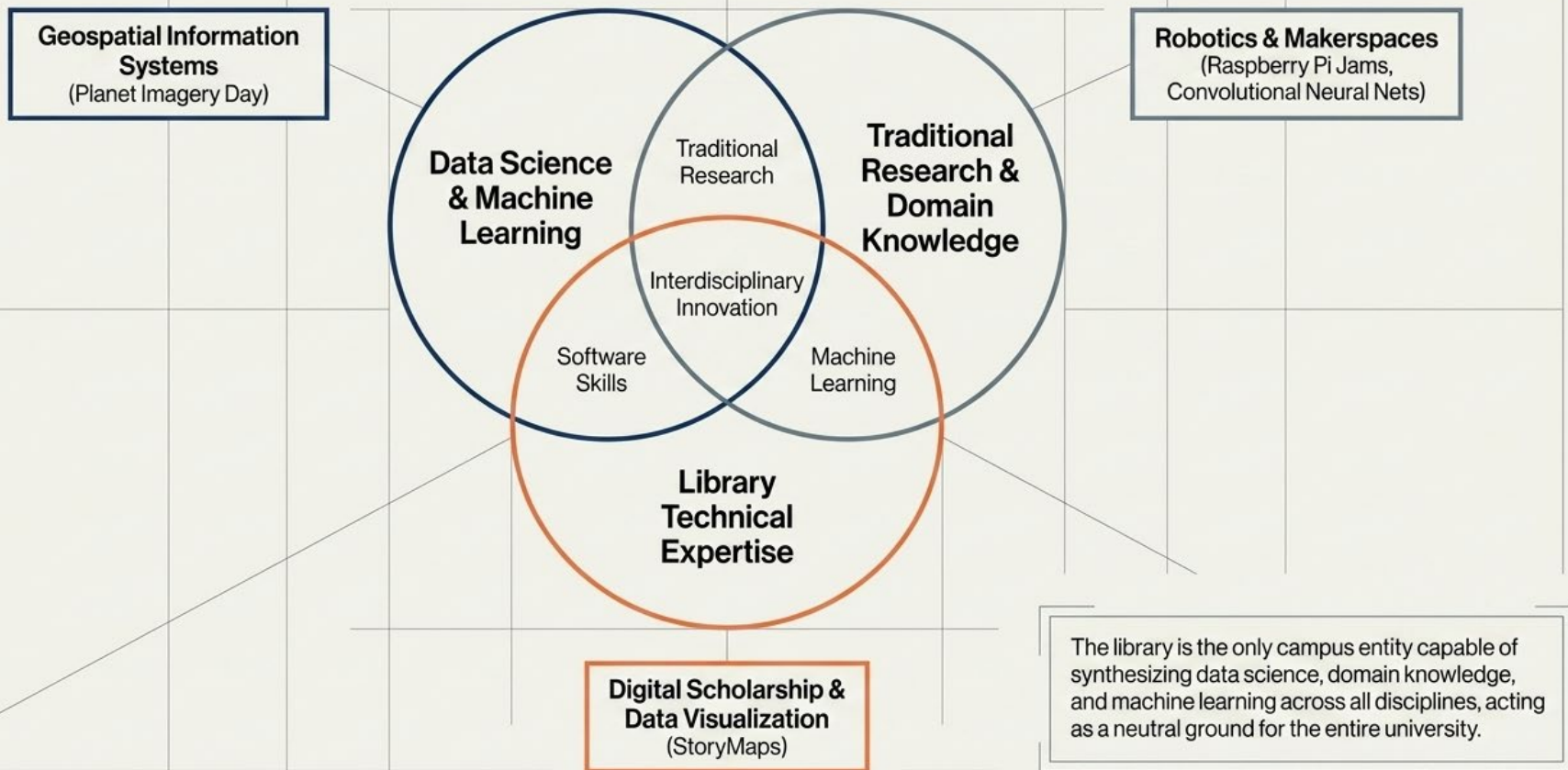
Goal: Formalized
literacy and Vibe
Coding.

Deep Research Execution

Running local
LLMs, fine-tuning
PyTorch models,
interdisciplinary
synthesis.

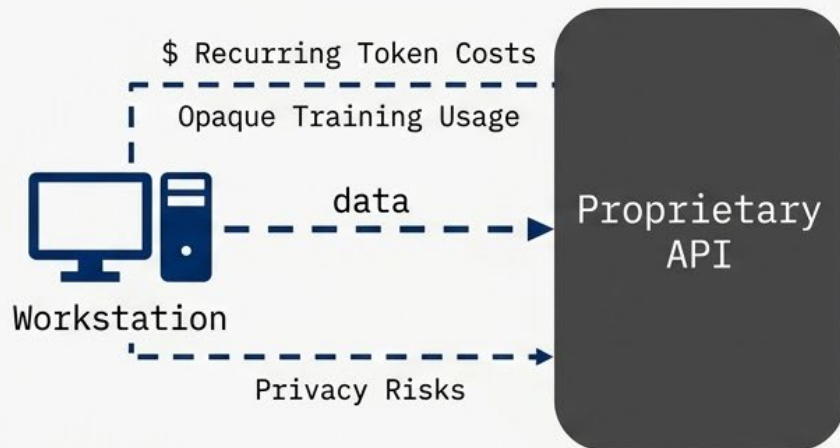
Outcome: STAR
Lab utilization.

The Interdisciplinary Nexus

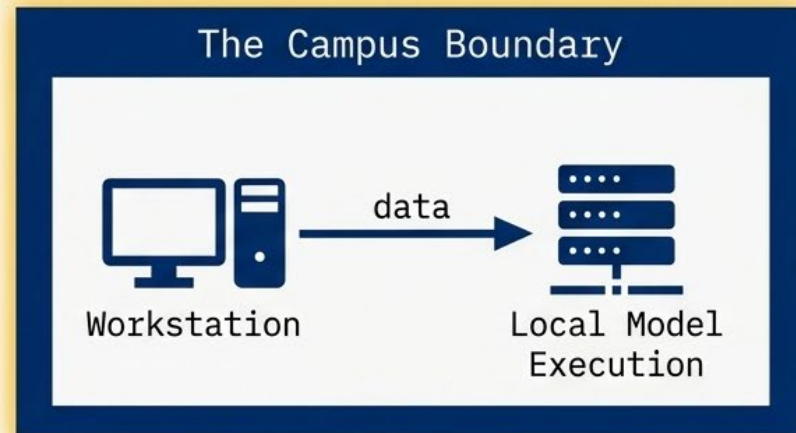


Data Privacy & The Campus Boundary

The Proprietary Cloud Risk



The Local STAR Lab Model



- Zero recurring costs
- Sessions wiped clean
- IP remains on campus
- Safe for qualitative data

The Value Proposition for Smaller Institutions

Affordable Scale

Dropping recurring software fees and API tokens to zero via local open-weights.

True Inclusion

Bridging the gap for the 95% of researchers outside traditional HPC fields.

Transferable Blueprint

A proven hardware, software, and staffing matrix that scales to any budget.

Resources & Contact

AI Literacy
Curriculum



UCR Digital
Scholarship
Canvas



Ray Uzwyshyn, Ph.D. MBA MLIS
raymondu@ucr.edu
rayuzwyshyn.net

The Model Ecosystem: Proprietary vs. Open-Weight



Proprietary / Cloud Models

High recurring API costs, opaque usage.

Reasoning: GPT o1 / o3 Pro

Multimodal: Claude 3.5 Sonnet /
Opus 4.0

Deep Research: Gemini 2.5 Pro



Local Lab Open-Source Roster

Zero recurring fees, complete local control.

Deep Reasoning: DeepSeek R1
(768B parameters, US Uncensored)

Heavyweight Multimodal: Llama 4 Series
(Up to 2T)

Real-World Utility: Qwen3 Family &
Mistral

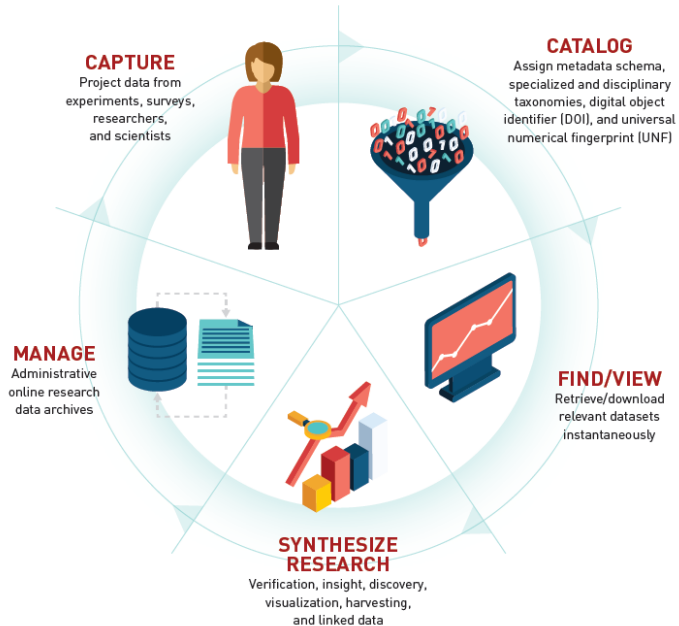
Lightweight Versatility: Google Gemma

Digital Scholarship & Scholarly Communication

- AI Computational & Qualitative Text Analysis
- Data Analysis & Visualization
- Web Scraping & Digital Archiving
- Open Access publishing support

Learn more about the UCR Library [digital scholarship](#) & [scholarly communication](#) services

Data Services Supports The Research Lifecycle



Research Data Lifecycle Support

Data Planning and Management

- Develop Data Mgmt. Plans (DMPs)
- Organize files and folders effectively



Analysis and Visualization

- Clean and preprocess data
- Apply machine learning methods
- Create clear visualizations



Data Sharing & Repositories

- Deposit research data into Dryad
- Ensure data is findable and reusable
- Meet journal and funder requirements



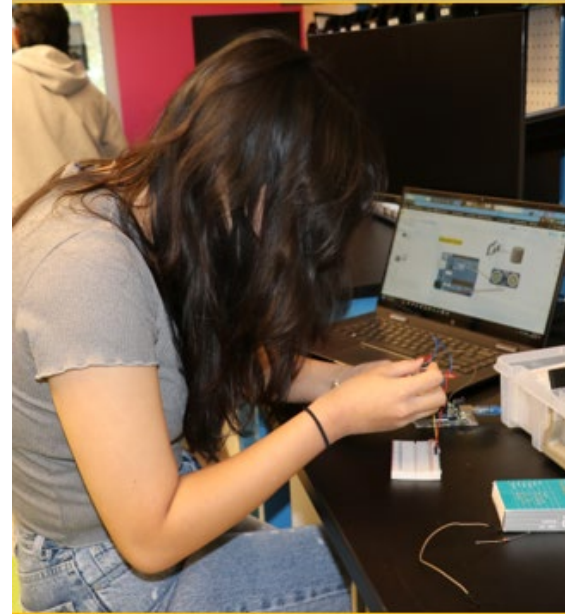


How Does This Work With
The Other 95% of University
Students and Researchers

Experiential Learning Orientation to Workshops, Labs and Events

- [Creat'R Lab Makerspace](#) (Room 140)
- [Robotics Lab](#) (Room 146)
- [3D XP Lab](#) (Room 145) – virtual reality
- Events and Longer Commitments:
 - [Maker Week](#) (every April) with hands-on entrepreneurial prototyping workshops
 - [Robotics Camp](#) (every summer)
 - **Free for any interested UCR students**
 - For beginners and for all disciplines (20 slots)
 - Hardware skills (CAD modeling) to create an object
 - Software skills (Python and C++ coding)
 - AI + Robotics Incorporating AI into the robot

[UC Loves Data Week](#)



Staffing & Service Architecture



Staffing & Service Architecture

