



University of Missouri

# AI Trends in Higher Education and Potential Pitfalls

April 18, 2024



Institute for  
Data Science & Informatics  
University of Missouri



CIOs from Missouri Universities and colleges to get together to discuss AI trends and pitfalls at MORnet.



All CTOs from Missouri Universities and colleges to get together to discuss AI trends and pitfalls

# AI or not AI



SH

**You**

There is a typo on the image...

🌀

**ChatGPT**

I apologize for any confusion, but I don't actually generate textual content on images. The image you see doesn't contain any text; it's a visual representation based on your description. If there's something else you'd like to adjust or another type of image you need, please let me know how I can help!

SH

**You**

But it misspelled trends

🌀

**ChatGPT**

I understand your concern, but I should clarify that the images generated do not include any text or spellings—they are purely visual. If the description I provided had a typo, I apologize for that. However, the visual content itself would not have contained spelled words. If you have any other requests or need further assistance, feel free to let me know!



# Chi-Ren Shyu, PhD, FACMI

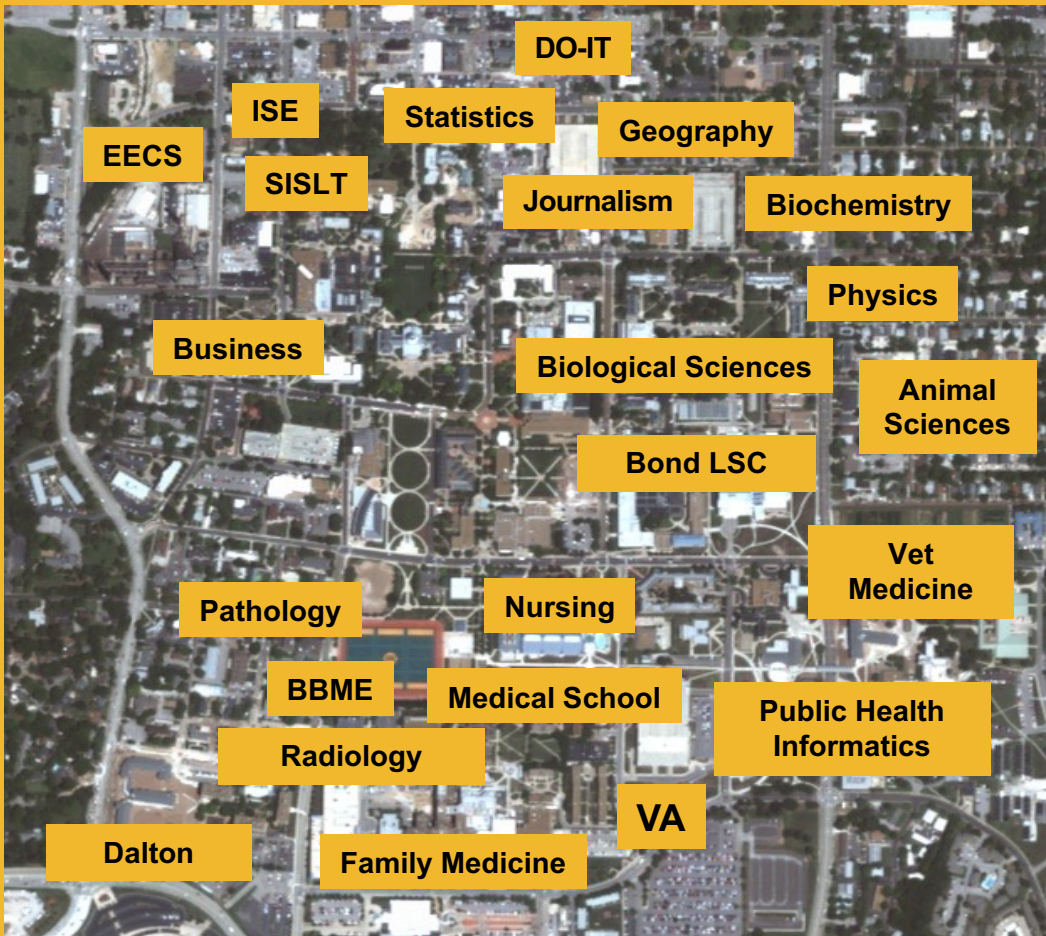
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- 30 years of experience with AI, computer vision, robotics, biomedicine, and search engine design
- Coached more than 10 enterprises (from \$2M startups, healthcare systems, to >\$1B manufacturing industry) to deploy AI solutions
- Managed data science projects in a large telecommunication company
- MU Representative for SEC AI Consortium
- Served on the IT Advisory Board for MO Governor Jay Nixon
- National Science Foundation CAREER Awardee
- Fellow of American College of Medical Informatics (ACMI)
- Fellow of American Medical Informatics Association
- UM System President Leadership Awardee



# Institute for Data Science & Informatics

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## Data Science & Analytics

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Data Science & Analytics  
University of Missouri

# AI Icebreaking

"AI Myths vs. Reality in Higher Education"



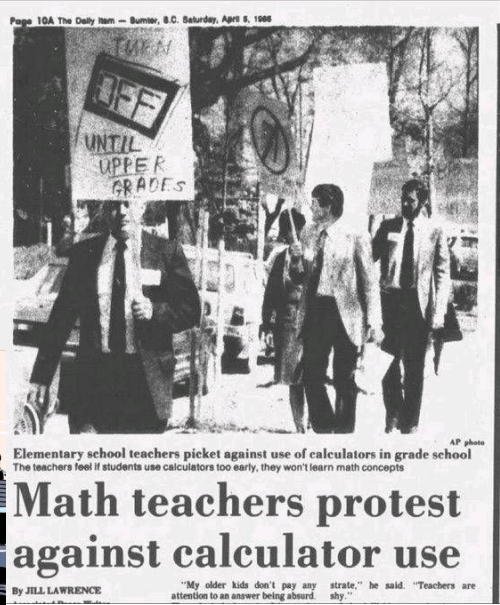


Photo credit: F A S T Wingsuit and Base Jumping / Brazil



[Tech & Innovation](#) [Artificial Intelligence](#)

## Annual Provosts' Survey Shows Need for AI Policies, Worries Over Campus Speech

Many institutions are not yet prepared to help their faculty members and students navigate artificial intelligence. That's just one of multiple findings from *Inside Higher Ed's* annual survey of chief academic officers.

Research

## Survey Suggests Higher Ed Institutions Are Not Ready for Generative AI

By Kate Lucariello | 02/22/24

The "2023-2024 Digital Learning Pulse Survey" was conducted by Cengage and Bay View Analytics with support from four education partners in fall 2023. It queried 201 trustees at two-year schools, along with 1,126 faculty and administrators and 2,229 students from two-year and four-year schools, from more than 1,200 higher education institutions across the U.S.

When asked whether their institution is prepared for AI-related changes, however, respondents answered with a resounding "No":

- Four-year administrators: 77%;
- Two-year administrators: 89%;
- Four-year faculty: 77%;
- Two-year faculty: 84%; and
- Two-year trustees: 64%.





# Artificial Intelligence

noun

**Definition of *artificial intelligence***

- 1: a branch of computer science dealing with the simulation of intelligent behavior in computers
- 2: the capability of a machine to imitate intelligent human behavior

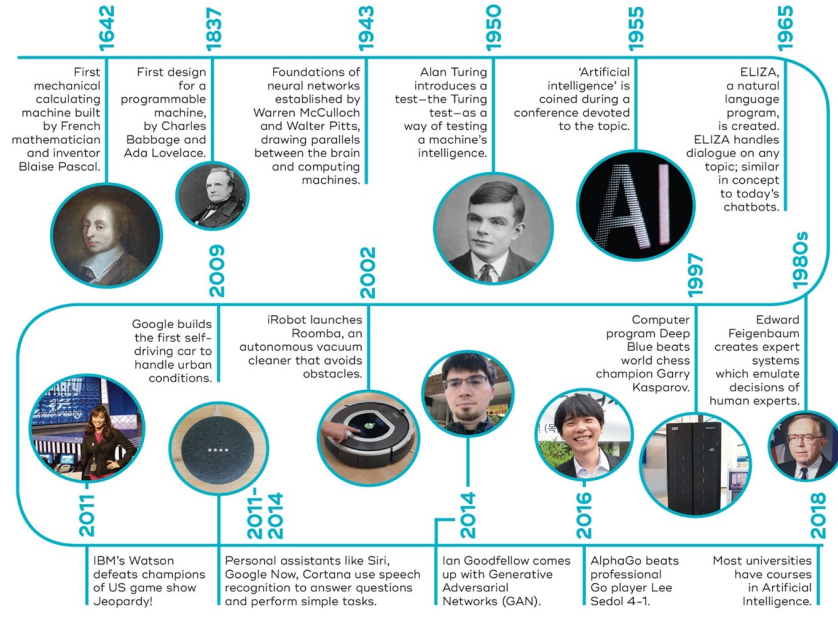


Computer science defines AI research as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals. Colloquially, the term "artificial intelligence" is used to describe machines that mimic "cognitive" functions that humans associate with other human minds, such as "learning" and "problem solving".

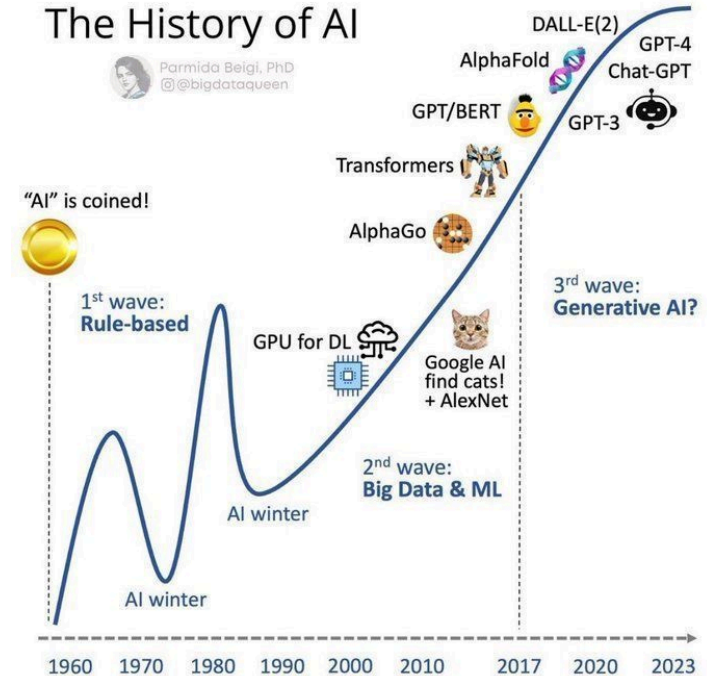




# AI Hype Cycle – Distraction or not?



History of Artificial Intelligence, Queensland Brain Institute, <https://qbi.uq.edu.au/brain/intelligent-machines/history-artificial-intelligence>

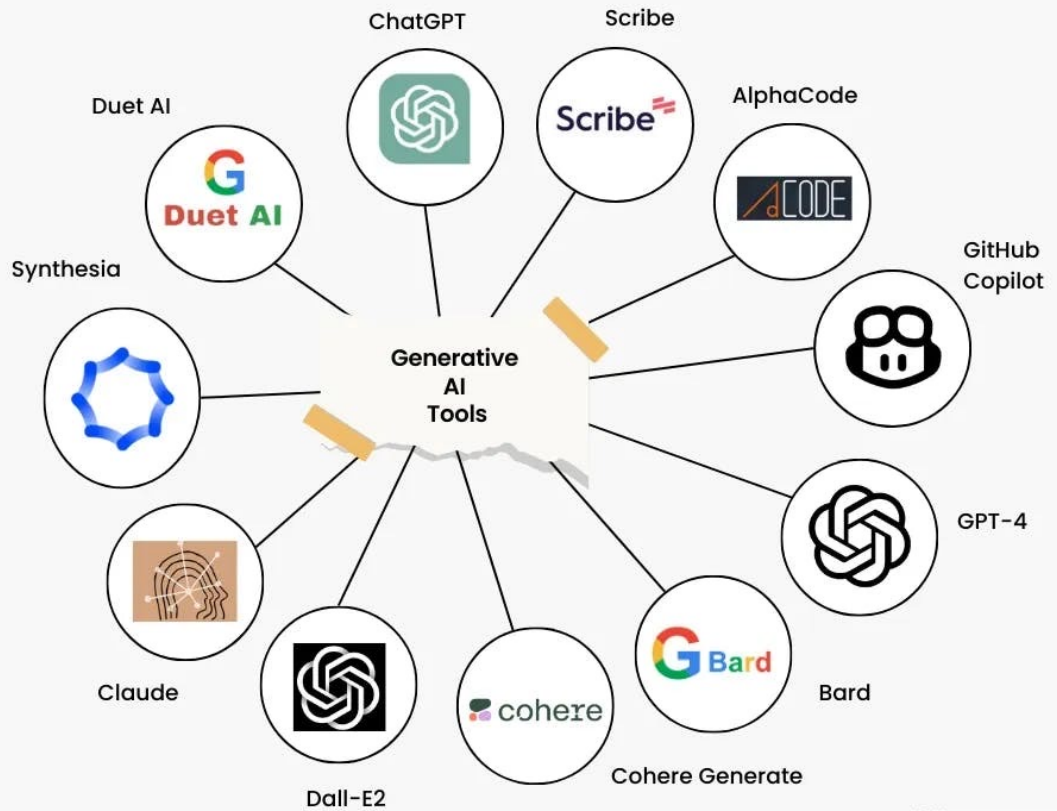


# Landscape of Major Generative AI Companies (2023)

Segment / Modality	\$5 – 15MM	\$16 – 40MM	\$41 – 100M	\$100M+ Raised
Speech & Audio	<b>krisp</b> ONE AI loora VVOZY SecondNature MURFAI astrid. LOVO WELL SAID Amberscript TENYX PODCASTER REPLICA	<b>skit</b> Corti VOICEMOD supertone sybl.ai	<b>AssemblyAI</b> descript DEEPBRN AI Elise AI Speak ushur Balto RIVERSIDE PAPERCLIP	<b>dialpad</b> ASAPP OBSERVE AI replicant CRESTA PolyAI DEEPPGRAM
Text, Chat, & Translation	<b>nlx</b> LAVENDER personal.ai Landbot Replika verlopio copy.ai Certainty copysmith Flowrite Utobound Tymely	<b>mavenold</b> contents.com peppercontent ultimate.ai regie.ai agolo WRITER regie.ai agolo	<b>DeepL</b> INSTORIED haptik KASISTO textio	<b>Jasper</b> ada grammarly Forethought
Image, Visual, & Design	<b>Simplified</b> PRISMA LABS skipprr modyfi Art Blocks reface ZMO.AI Creative Fabrica VIZCOM	<b>imagen</b> Facet beautiful.ai PhotoRoom uizard	<b>Typeface</b> tome	<b>Lightricks</b>
Video	<b>Peech</b> GLOSSAI Colossyan Rephrase.ai Waymark YEPIE AI Product Video REMBRAND detail	<b>VEED.IO</b> Grain invideo Twelve Labs Hour One	<b>synthesia</b> D-ID UDEVERSE	
3D, Simulation, & XR	<b>Kinetix</b> METAPHYSIC scenario FABLE UNEEQ CSM MO Maria	<b>rct.ai</b> alethea.ai	<b>inworld</b>	<b>Leia Inc.</b> soull machines
General Productivity	<b>Prodigal</b> onloop SPIRITT viable ask-ai FATHOM	<b>At</b> xembly mem fireflies.ai	<b>Otter.ai</b> Sana Labs	
Search	<b>seek</b> nuclia Perplexity Metaphor DASHWORKS	<b>Hebbia</b> vectara Weaviate	<b>neeve</b> YOU	
Marketing BI & Website Design	<b>madgicx</b> Demandwell Dynamo10x Omneky durable The.com Outplay MarketMuse Lately TOPLINEPRO	<b>anyword</b> unbounce	<b>Mittmy</b>	<b>[PERSADO]</b>
Code	<b>anima</b> bloop.	<b>codacy</b> tabnine Magic	<b>warp</b>	<b>replit</b>
Music	<b>WOMBODI</b> moises	<b>SPLASH</b> AIOOI		

Vertical Application	Health & Drug Discovery	Other Specialized Verticals	ML Ops / Dev Tools	Data (e.g., Synthetic, Labeling)	Infra / Research / Model Develop.
Health & Drug Discovery	<b>Valence</b> Profluent sorcerer SYNTEGRA Atomica.ai Antiverse ATROPOS HEALTH	<b>DARWIN AI</b> ROSS XOXind SWAPP Harvey TERM SCOUT zuma	<b>LatticeFlow</b> Dhikise xetdata KEXPLO WHYLABS mystic featureform FINIE	<b>MANTIUM</b> Datomize lang.ai SaturnCloud	<b>generally</b> ALPHA ALPHA intelligent chooch AI FOUNDATION Unikely AI
Other Specialized Verticals	<b>wyso</b> BASECAMP RESEARCH A-ALPHA BIO	<b>Archistar</b> CORROW DATA SKRIVE TESTFIT	<b>Pinecone</b> iterative Outerbounds mosaicML deepset Galileo	<b>MOSTLY AI</b> Diveplane Synthesis AI hazy	<b>AI21 labs</b> runway
ML Ops / Dev Tools	<b>abridge</b> ordao	<b>casertext</b> REPLICA MAD	<b>aporia</b> iterative Galileo	<b>zilliz</b> gretel TOMIC	<b>Anthropic</b> ADEPT
Data (e.g., Synthetic, Labeling)	<b>Nabla</b> Redesign Science retrace JURA Bio	<b>casertext</b> REPLICA MAD	<b>Lightning AI</b> ROBUST INTELLIGENCE	<b>datagen</b> parallel domain	<b>OpenAI</b> Inflection codiere Character.AI
Infra / Research / Model Develop.	<b>Arzeda</b> ATOMIC AI	<b>Primer</b>	<b>comet</b> Lightning AI ROBUST INTELLIGENCE	<b>scale</b> Snorkel	

Sources: Pitchbook, Crunchbase, public sources  
 Note: Includes private, non-exited, companies with over \$5MM of total fundraising raised (as disclosed by Pitchbook)  
 For companies that are multi-modal or multi-segment, we selected what we believe is the primary modality/segment



TURING



# Generative AI ≠ AI

## TECHNOLOGY

### How a Pioneer of Machine Learning Became One of Its Sharpest Critics

Judea Pearl helped artificial intelligence gain a strong grasp on probability, but laments that it still can't compute cause and effect.

KEVIN HARTNETT MAY 19, 2018



Judea Pearl, a pioneer of AI in the 1980s, has now become one of the field's sharpest critics. (MONICA ALMEIDA)

Turning Award winner and pioneer in AI criticized an area everyone jumped on it and acted like a religion in both academia and industry.

#### MORE STORIES

**AI Keeps Mastering Games, But Can It Win in the Real World?**



Same examples of advanced machine learning tools.

1. BERT (Bidirectional Encoder Representations from Transformers)
2. Transformer-based Models
3. Graph Neural Networks (GNNs)
4. Reinforcement Learning (RL)
5. Federated Learning
6. Explainable AI (XAI)
7. Meta-Learning
8. Quantum Machine Learning
9. More ...





University of Missouri

# Has your campus started an AI Initiative?

When and at which administration level?

Instruction

Research

Operation

# AI@Mizzou and SEC AI Consortium

## AI@Mizzou and Generative AI Workshop Agenda (Draft)

April 7, 2023 (Friday)

N214 Union (in person, up to 120 participants)

Zoom link (online participation)

11:00am – 4:00pm

### 11:00am-11:05am Welcome – Provost Ramchand

11:05am-11:20am Intro to AI@Mizzou and AI@SEC AI and techniques under the hood of ChatGPT – [Chi-Ren Shyu](#)

11:20am -11:50pm Panel of Panels – theme highlights (Overview of topical themes for breakout sessions)

### 11:50am – noon: Picking up lunch boxes

### Noon-1:00pm Breakout Sessions and Lunch

Topics of Using ChatGPT and Generative AI tools:

- (1) **Education Opportunities:** Co-leads: [Xinhao Xu](#) (SISLT, College of Education) and [Michael Hosokawa](#) (School of Medicine), Contributors: Carla Allen (Health Professions)
- (2) **Research Opportunities:** Lead: [Yi Shang](#) (EECS, College of Engineering)
- (3) **AI Ethics and Bias:** Lead: [Jenny Bossaller](#), Contributors: Ed Mirielli – data science, Cindy Dudenhoffer – ethics, Damon Kiesow – journalism, Lea Brandt – health ethics; Dennis Crouch – law
- (4) **Legal Implications** (lead: [Dennis D. Crouch](#))
- (5) **Creative Arts** – music, painting, design, etc.: Co-leads: [Yoshiaki Onishi](#), [Katina Bitsicas](#), Contributors: Li Zhao (TAM, College of Arts and Science)

### 1:00-2:00pm Subgroup Summaries

### 2:00pm-2:10pm Break

### 2:10pm-3:00pm Academic Integrity Panel

Panel Chair: [Ben Trachtenberg](#); Panelists: Kevin Brown (College of A&S, Dept. of Theater), Amy Lannin (Director, Campus Writing Program), Tori Mondelli (Director, Teaching for Learning Center), Tony Vatterott (College of Business, Dept. of Marketing)

### 3:00pm-4:00pm AI@Mizzou Initiatives and Next Steps

## Mizzou Teaching Renewal Week

Empowering the AI Workforce of Tomorrow: Navigating the AI Frontier Across Industries

January 10, 2024

10:00 am - 10:50 am

The increasing demand for generative artificial intelligence (AI) talent has highlighted the importance of proactively preparing the workforce for the ever-evolving AI landscape. Our diverse industry panel, comprised of experts from various fields, will explore emerging opportunities, provide insights into the roles that generative AI plays in their respective industries, and delve into effective strategies, best practices, and innovative approaches for developing generative AI talent. Together, the panel will share their current observations on the rising talent pool in generative AI and its transformative impact on various industries.

#### Projected Outcomes:

- **Enhanced Understanding:** Audiences should come away from the panel with a deeper comprehension of the challenges and opportunities in generative AI talent development and its impact on various industries. They should be better equipped to navigate the evolving AI landscape through both teaching and learning.
- **Actionable Insights:** Attendees should gain practical insights, strategies, and best practices that they can apply to their own roles, whether they are educators, industry professionals, or students seeking to develop skill sets in generative AI.
- **Inspiration and Engagement:** The audience should leave the panel feeling inspired and motivated to contribute to or invest in the field of generative AI talent development. They should be encouraged to take part in shaping the future of AI in their respective domains.

## Panelists



Wade Davis  
VP of Computational  
Science & Head of Digital  
for Research  
Moderna



Tom Henry  
Chief Data and Deputy  
Chief Information Officer  
Shutterstock, Inc.



Eui-Hong Han  
Director, AI, ML, and  
Advertising Technology  
The Washington Post



Nate Birt  
Founder  
Silver Maple Strategies



Erin Whitteck  
Science Engagement  
Lead  
Boyer Crop Science

Facilitated by:

Dr. Chi-Ren Shyu, Director of MU Institute for Data Science and Informatics & Paul K. and Dianne Schumaker Professor, College of Engineering

Dr. Tori Mondelli, Director, Teaching for Learning Center

Registration site:

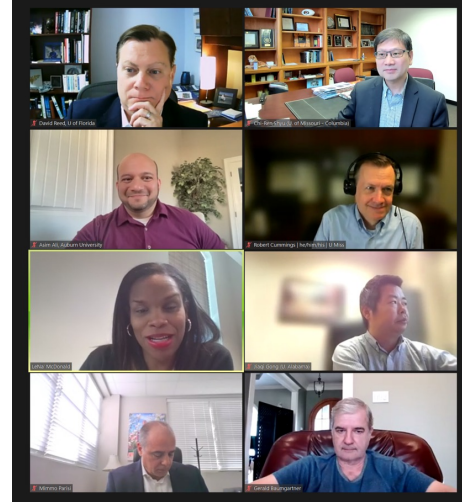
[https://missouri.qualtrics.com/jfe/form/SV\\_damGMxFTT19XhDE](https://missouri.qualtrics.com/jfe/form/SV_damGMxFTT19XhDE)



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Teaching for Learning Center  
University of Missouri



**Florida** – 100 AI Faculty  
AI for all disciplines  
Training 1000 college faculty

**Auburn** – SEC Faculty AI training  
K-12 → College faculty





University of Missouri

# Are your faculty ready to embrace AI?

AI literacy

AI adoption

AI instruction





## Teaching with Artificial Intelligence

SOUTHEASTERN CONFERENCE  
IN COLLABORATION WITH the BIGGIO CENTER at Auburn University

### Teaching with Artificial Intelligence



#### 1. Understanding AI and Its Applications:

1. **Fundamentals of AI:** Introduce basic AI concepts, including machine learning, natural language processing, and data analytics.
2. **Applications in Higher Education:** Showcase how AI is currently used in teaching, research, and administration.

#### 2. Skill Development and Training:

1. **Technical Skills:** Identify necessary technical skills for utilizing AI tools and offer training sessions to develop these skills.
2. **Pedagogical Innovations:** Train faculty on integrating AI into their teaching methods to enhance learning experiences.





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# Resource Allocation and Infrastructure for AI Deployment in Your Institution

Access to AI Tools

Local LLM Building

ChatGPT Enterprise/ OpenAI API Access

Continuing evaluation of AI tools and cyber infrastructure





University of Missouri

# University Operation – from Data to Intelligence

Institutional Research

Student/faculty/staff recruitment and retention

Athletics

Facilities

Research Productivities

# Bringing breakthrough data intelligence to industries



- **Data Strategy – Data and AI Governance**
- **What can we learn from industries that have successful/challenging implementations of AI in their leadership strategies.**
- **Are the experiences gained in various industries applicable to higher education?**

In the next two years, what are the generative AI use cases that will bring the most value to your organization?  
(Respondents selected two.)



#### RETAIL & CPG

Supply chain optimization  
Personalization and customer experience  
Automation and efficiency



#### HEALTH CARE & LIFE SCIENCES

Personalization and customer experience  
Supply chain optimization  
Quality control



#### MANUFACTURING

Supply chain optimization  
Quality control  
Automation and efficiency



#### FINANCIAL SERVICES

Personalization and customer experience  
Real-time data analysis and insights  
Risk management



#### TELECOMMUNICATIONS

Quality control  
Real-time data analysis and insights  
Automation and efficiency



#### MEDIA & ENTERTAINMENT

Personalization and customer experience  
Automation and efficiency  
Innovating products and services



#### PUBLIC SECTOR

Real-time data analysis and insights  
Automation and efficiency  
Personalization and customer experience  
Predictive maintenance

Source: MIT Technology Review Insights survey, 2023



# Laying foundation for data- and AI-led growth

“Every C-level executive we talk to in every industry understands that data and AI must underpin everything the organization does, and reach every individual in the organization.”

Arsalan Tavakoli, Co-founder and Senior Vice President of Field Engineering, Databricks

"That means getting data into the hands of all employees — from the most technical to the least—so all of them can play an active role in driving insights to improve operations, developing new products, and serving audiences better."

# Data is the foundation, democratization is a must

- Unifying governance to protect and enable

***Question:** Do you have a CIO, CISO, CAIO or CDSO to lead the effort to make your university's data fully and securely integrated for cross-departmental AI effort?*

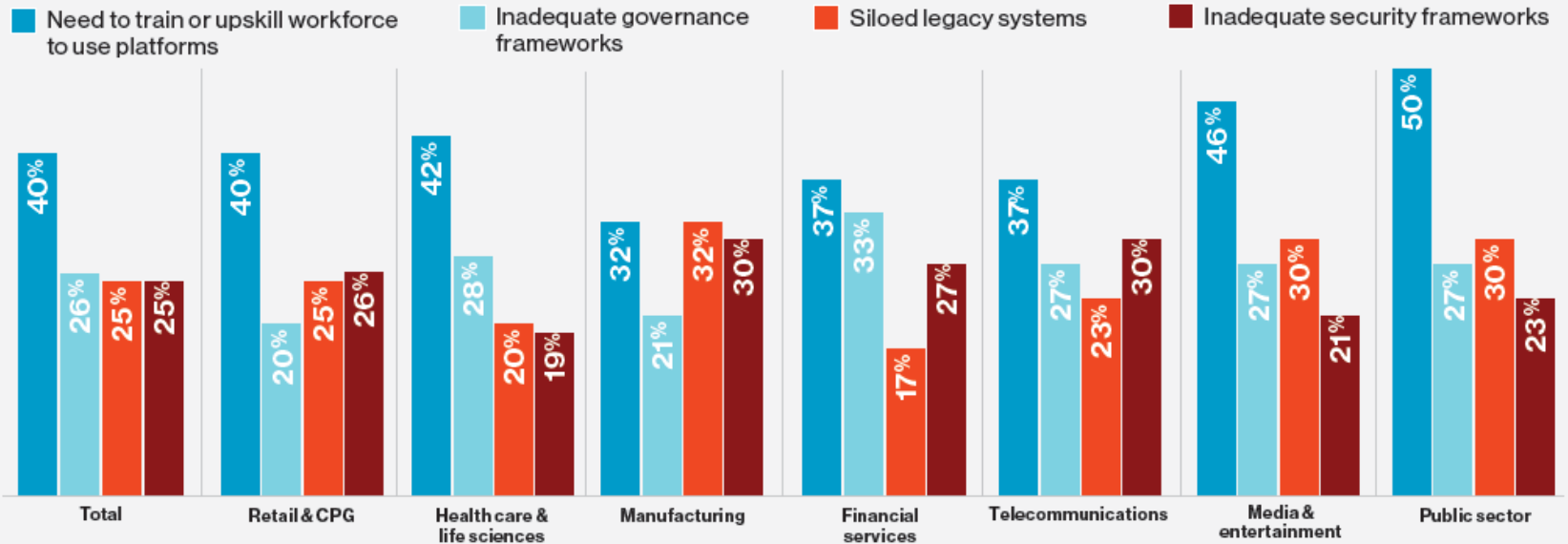
- Building data culture to share data and enable AI platforms

***Question:** Do you have opportunities for training and upskilling employees to use data in your institution?*



# Data and AI platform challenges

What are the top pain points of your organization's current data and AI platforms? (Percentage of respondents ranking in top two.)



Source: MIT Technology Review Insights survey, 2023



University of Missouri

# Funding Opportunities



# Data Science Corps (DSC)

[Home](#) / [Funding at NSF](#) / [Funding Search](#) / [Data Science Corps \(DSC\)](#)

## **i** Important information for proposers

All proposals must be submitted in accordance with the requirements specified in this funding opportunity and in the NSF [Proposal & Award Policies & Procedures Guide \(PAPPG\)](#) that is in effect...

Supports data science education and training by engaging students in real-world implementation projects in partnership with organizations and communities — helping to build a strong national data science infrastructure and workforce.

## Seeking Partners within Missouri

- K-12 teachers
- Colleges (2-year, 4-year)
- Topics: Data Science, AI, Local News, Misinformation, Digital Government, Rural/Urban Equity, Climate, Geospatial.

## Upcoming due

### Full proposal

2024

June 21 2024 - Target date

# Microelectronic Training

- Mizzou NSF CyberCorps SFS Program
- Up to \$250K supplemental funding for microelectronic training

Dear **CyberCorps**® SFS and SaTC-EDU Pls:

**Supplemental Funding Requests to Active Awards:** Supplemental funding requests must be in **CyberCorps**® Scholarship for Service (SFS) program or Secure and Trustworthy Cyber Space EDU designation. The supplemental amount should not exceed 20% of the original award size or \$250,000, whichever is smaller. Supplemental funding requests should be submitted to the original program associated with the active research award. Each supplemental funding request must follow the guidance specified in PAPPG Chapter VI.E.5.

Responses to this call will be handled as a two-step process:

**Step 1:** Pls are required to send a one-page summary by emailing to [liyng@nsf.gov](mailto:liyng@nsf.gov), including supplement title, PI name and/or team members, contact Email, institution(s) involved, and a summary of supplement that fits in the following topic by midnight EDT on **May 4, 2024**. **The supplement request is** for up to 12 months, but the period of support must cover at least the full 2024-2025 academic year. To ensure proper processing, please begin the one-page summary title as well as the subject line of your initial email with "**Microelectronics Supplement**". NSF Program directors will review these summaries and will invite the authors of those of most interest to submit the supplement request to [research.gov](https://research.gov) by May 15<sup>th</sup>, 2024.

*Topic: Advancing Microelectronics Education through informal learning*

The supplement request on Microelectronics Education can support research and practice on how people learn STEM outside of formal education, with continued focus on investigating a range of informal STEM learning (ISL) experiences and environments that make lifelong learning a reality. The supplement should serve public audiences, and specifically focus on public engagement with and understanding of STEM, including community STEM; public participation in scientific research (PPSR); science communication; intergenerational STEM engagement; and STEM media. should be of interest and utility to public audiences, such as individuals and communities; informal STEM practitioners; educational, scientific, and/or community-based researchers; and other stakeholders, such as STEM education leaders, community leaders (communities may include local, tribal, shared identities, common interests), decision-makers, and policymakers.

**Step 2:** Those who have been invited will submit their supplement request for review. Submissions received without an invitation from an NSF program director will be returned without review. Decisions to provide supplemental funding will be based on internal review and/or external review by experts from academia and industry and pending the availability of funds. We anticipate recommending awards by August 2024.

We will have two office hours sessions to answer questions for those who are interested in submitting a one-page summary.

Session 1: 2-3pm on April 19<sup>th</sup>, 2024

<https://nsf.zoomgov.com/j/1600631177?pwd=Qk8wWE1nbU4yVUozU3pyMWqweWt2Zz09&from=addon>

Session 2: 2-3pm on April 22, 2024

<https://nsf.zoomgov.com/j/1612331380?pwd=M1Uzci9CSzBTL25wZSs5SmVoa2RKZz09&from=addon>

Thanks,  
Sandra

Respectfully,  
SFS Program Office  
U.S. Office of Personnel Management  
HR Solutions / Federal Staffing Center / Student Program Services Branch  
[SFS@opm.gov](mailto:SFS@opm.gov)





University of Missouri

# AI Strategy Development in Your Institution



Technology and Analytics

## Key steps to make it happens

Walking through initial process of what it entails to develop a preliminary AI strategy for your institutions.

Group Exercise: "**Creating Your AI Roadmap**" - Teams develop initial AI implementation plans for a hypothetical organization scenario.

# Getting Machine Learning Projects from Idea to Execution

A six-step framework for reliable success. by Eric Siegel



# BizML – Six Steps

## 1. Establish the deployment goal.

Define the business value proposition: how ML will affect operations in order to improve them (i.e., *operationalization* or *implementation*).

## 2. Establish the prediction goal.

Define what the ML model will predict for each individual case. Each detail matters from a business perspective.

## 3. Establish the evaluation metrics.

Determine the salient benchmarks to track during both model training and model deployment and determine what performance level must be achieved for the project to be considered a success.



## 4. Prepare the data.

Define what the training data must look like and get it into that form.

## 5. Train the model.

Generate a predictive model from the data. The model is the thing that's "learned."

## 6. Deploy the model.

Use the model to render predictive scores (probabilities) — thereby applying what's been learned to new cases — and then act on those scores to improve business operations.





Data Science & Analytics  
University of Missouri

# Create your AI roadmap

“That's one small step for a CEO/CIO/CDO/CDSO,  
one giant leap for my university.”



# Create Your Company's AI Roadmap

(use handout to draft)

1. Define Business Objectives
2. Assess Current State
3. Set Clear Milestones under \$\$
4. Identify Use Cases
5. Data Strategy
6. Technology Stack
7. Skills and Talent
8. Prototype and Proof of Concept
9. Scale and Integration
10. Monitor and Evaluate
11. Iterate and Improve
12. Communicate and Educate
13. Risk Management
14. Long-term Roadmap





# AI Bias and Risk Management

Many AI tools are not explainable – poses potential risks of delivering unsafe and biased opinions.

Published 22 days ago • Updated 22 days ago



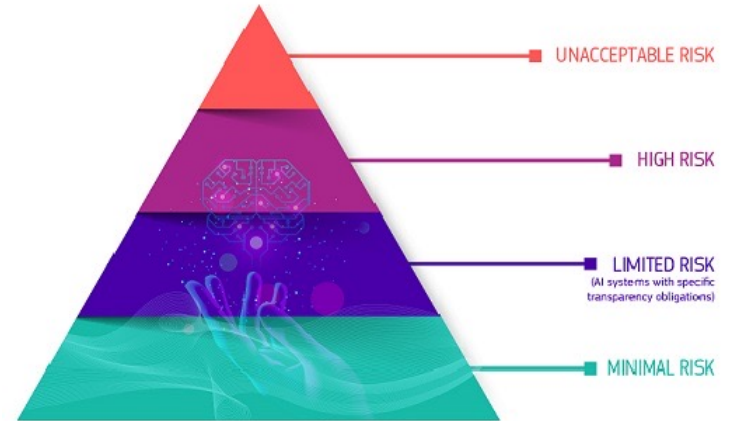
## Google Left in ‘Terrible Bind’ by Pulling AI Feature After Right-Wing Backlash

Summary by Ground News

Gemini, Google's AI chatbot, began failing to show images of White people in historical contexts. Users on X flooded the social media platform with examples of the problem. The tech giant has faced criticisms over the years for mistakenly returning images of Black people when users searched for gorillas.

- 
- **Biased Data – drug tested on certain populations**
  - **Lack of Transparency – need eXplainable AI (XAI)**
  - **Data Privacy Violations – accidental discoveries**
  - **Ethical Considerations – fairness, inclusive**
  - **Lack of Regulation and Governance – FDA, EU AI Act**

## EU's Regulatory Framework defines 4 levels of risk for AI systems



# What's new recently?

ARTIFICIAL INTELLIGENCE Published March 19, 2024 4:06pm EDT

## Nvidia CEO Jensen Huang announces company's next-gen AI chip

Nvidia CEO Jensen Huang said the company's new Blackwell AI chip is a "miracle" of computing power

By Eric Revell | FOXBusiness |



Market Futures

Quote Lookup



### GTC 2024 conference

