



University of Missouri

# Expanding Quantum and AI-Enabled Cybersecurity Research and Workforce Development

Chi-Ren Shyu

Director of Institute for Data Science and Informatics

Chair, Executive Committee, MU Quantum Innovation Center

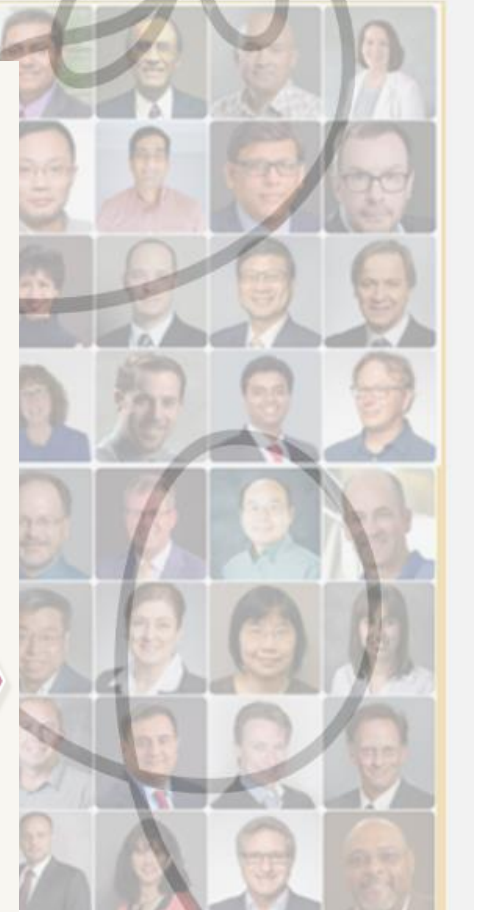
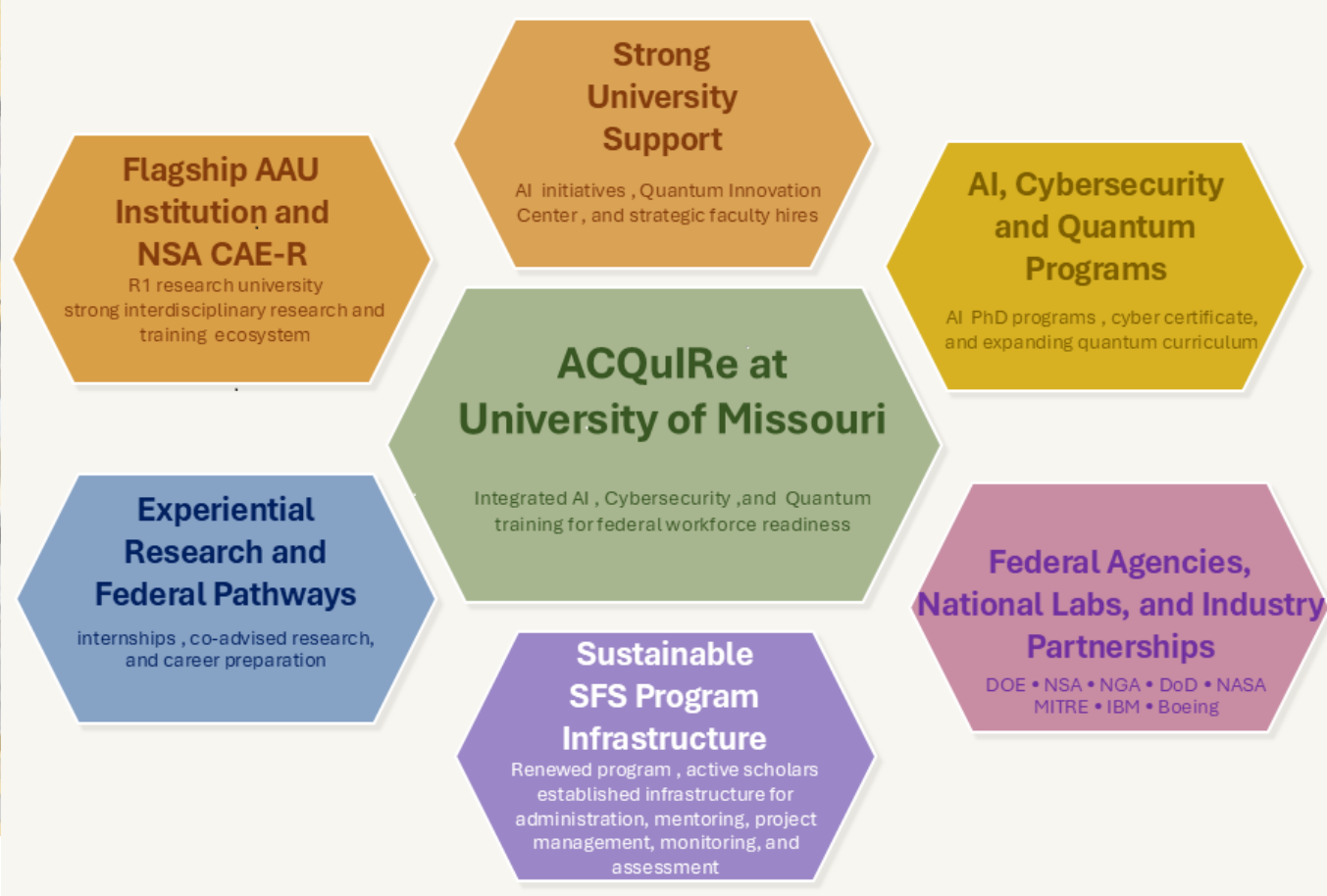
Associate Dean for Graduate Education and Strategic Initiatives, College of Engineering

University of Missouri - Columbia

Interdisciplinary Research Community to Support Cyber



**Mizzou Engineering**



Academics ▾ Admissions ▾ Departments ▾ Research ▾ Student Services ▾ Connect with Us ▾

**CYBER EDUCATION, RESEARCH AND INFRASTRUCTURE (CERI) CENTER**

Informatics

**CyberSecurity**  
@MIZZOU

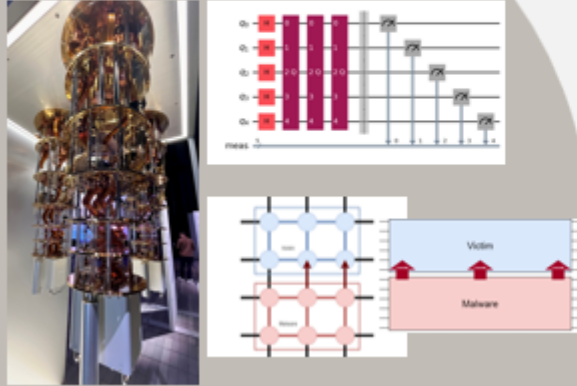
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**QUANTUM INNOVATION CENTER**



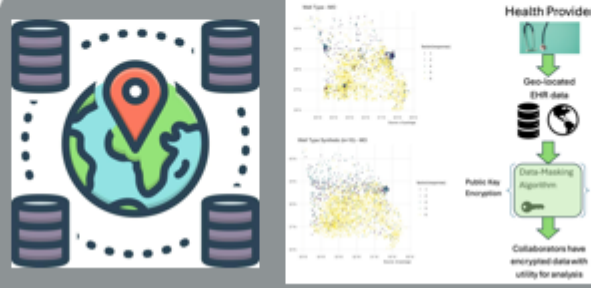


National Institutes of Health



# Quantum Cybersecurity Research

Crosstalk-based security impacts of quantum circuits, Multi-layered mitigation for crosstalk-based quantum malware studies.



# Geospatial Cybersecurity Research

Threat modeling and defense mechanisms for geospatial systems in smart cities, Privacy & utility preserving in sensitive geospatial data sharing.



# Healthcare Cybersecurity Research

Genomic tokenization in blockchain using a hybrid AES/ECC encryption scheme, User trust and privacy concerns across privacy-sensitive mobile health apps



# Graduate Certificate in Cyber Security

Cybersecurity skills are necessary for many industrial and governmental organizations. With an increasing number of network-connected and smart devices, malicious activities threatening data security and personal privacy are at an all-time high. The purpose of this graduate certificate is to prepare students and working professionals to understand the fundamentals and obtain practical skills in cybersecurity to meet growing demands for a highly trained cybersecurity workforce.



Existing Offering

# Program-level efforts

## Data Science and Analytics

[Overview](#) [Faculty](#) [Undergraduate](#) [Graduate](#) [Courses](#)

Demystify algorithms, strengthen your analytical skills, and gain insights from data through our high-engagement Data Science & Analytics learning experience.

Coordinated by the MU Institute for Data Science and Informatics and informed by our industry advisory board comprised of data science professionals, the Master of Science in Data Science & Analytics curriculum is a highly cohesive data science program built from the ground up to equip you with the practical skills and knowledge to discover, interpret, and effectively communicate data analytics solutions to assist organizations in enhanced informed decisions making.

MS and Graduate Certificates in DSA  
(2016 – Present)

## Graduate Certificate in Quantum Information and Computing

Mizzou College of Engineering

### Program Overview

The *Graduate Certificate in Quantum Information and Computing* provides a structured pathway for students and professionals to develop fundamental and applied expertise in the emerging field of quantum technologies. This program equips learners with the conceptual foundations, mathematical formalism, algorithmic techniques, quantum cybersecurity, and domain-specific applications of quantum computing. It is designed to serve graduate students and working professionals who aim to engage with quantum computing and its applications in optimization, machine learning, and real-world use cases.

Quantum Graduate Certificate  
Fall 2026 Offering



DEPARTMENT OF  
HIGHER EDUCATION &  
WORKFORCE DEVELOPMENT

Dr. Bennett Boggs, Commissioner  
[dhewd.mo.gov](http://dhewd.mo.gov)

April 1, 2026

Dr. Mun Y. Choi, President  
University of Missouri System  
321 University Hall  
Columbia, MO 65211

Dear President Choi:

Missouri Department of Higher Education and Workforce Development (MDHEWD) staff have reviewed the proposals submitted on behalf of University of Missouri – Columbia to offer the following new programs:

- BS, Aerospace Engineering, CIP 140201 (for classroom delivery at the main campus)
- BS, Neuroscience, CIP 261501 (for classroom delivery at the main campus)
- MS, Artificial Intelligence, CIP 110102 (for classroom, hybrid, and online delivery at the main campus)
- PhD, Artificial Intelligence, CIP 110102 (for classroom, hybrid, and online delivery at the main campus)
- PhD, Materials Science & Engineering, CIP 110102 (for classroom delivery at the main campus)
- PhD, Textile and Apparel Management, CIP 521902 (for classroom delivery at the main campus)
- BS, Sport Science, CIP 310501 (substantive curricular change only)
- MD, Medicine – MD, CIP 511201 (Existing program at the new site of School of Medicine – Springfield Clinical Campus, 3737 East Battlefield Rd., Springfield, MO) 65809)

AI MS & PhD  
Fall 2026 Offering

# QUANTUM INNOVATION CENTER

About the Mizzou-QIC

Affiliated Faculty

Internship Program

News and Events

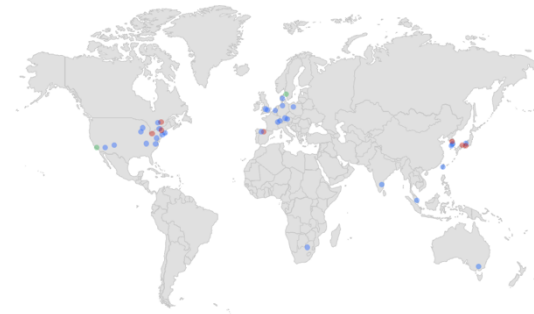
## WHAT WE DO

Welcome you to the Mizzou Quantum Innovation Center. Our mission is to advance quantum education, and innovation. Our mission is to advance quantum education, and innovation. Our mission is to advance quantum education, and innovation. Our mission is to advance quantum education, and innovation.

[LEARN MORE](#)

40 Quantum Innovation Centers

Including 8 with Dedicated Service systems



\* QIC  
\* QIC w/ Dedicated Service

### U.S. Government

- Air Force Research Laboratory
- Los Alamos National Lab
- Oak Ridge National Lab

### Americas

- Arizona State University
- Chicago Quantum Exchange
- Cleveland Clinic Foundation
- IBM-HBCU Quantum Center
- IBM-Illinois DA Inst – UIUC
- North Carolina State University
- PINQ<sup>2</sup>
- Rensselaer Polytechnic Institute
- Université de Sherbrooke
- University of Missouri**
- University of Rhode Island
- University of Southern California

### Europe, Middle East & Africa

- BasQ (Ikerbasque)**
- Consiglio Nazionale delle Ricerche
- CERN
- DESY
- Fraunhofer
- Lantik
- PSNC
- Quantum Application Lab
- QuantumBasel
- Sci. and Tech. Facilities Council
- UniBW Munich
- University of Copenhagen
- University of Witwatersrand
- WACQT
- National Quantum Computing Centre

### Asia Pacific

- IIT Madras
- Keio University
- Korea Quantum Computing
- National Taiwan University
- National University of Singapore
- RIKEN
- Sungkyunkwan University
- University of Melbourne
- University of Tokyo
- Yonsei University

# Affiliate Quantum Faculty Across Campuses

## 43 faculty across UM system



**Noel Aloysius**

Chemical and Biomedical Engineering, Mizzou  
Geospatial Applications  
[Meet Dr. Aloysius](#)



**Susanta Behura**

Animal Science, Mizzou  
Healthcare and Life Sciences  
Quantum Machine Learning (QML)  
[Meet Dr. Behura](#)



**Prasad Calyam**

Electrical Engineering and Computer Science, Mizzou  
Optimization  
Quantum Machine Learning (QML)  
Security  
[Meet Dr. Calyam](#)



**Rohit Chadha**

Electrical Engineering and Computer Science, Mizzou  
[Meet Dr. Chadha](#)



**Shie-Jie Chen**

Physics, Mizzou  
Health care and Life Sciences  
[Meet Dr. Chen](#)



**ZhiQiang Chen**

Physics, UMKC  
Civil Infrastructure Systems  
Geospatial Applications  
Healthcare and Life Sciences  
Optimization  
Quantum Machine Learning (QML)  
[Meet Dr. Chen](#)



**Baek-Young Choi**

Computer Science, UMKC  
Quantum Machine Learning (QML)  
Quantum Networking  
[Meet Dr. Choi](#)



**Masud Chowdhury**

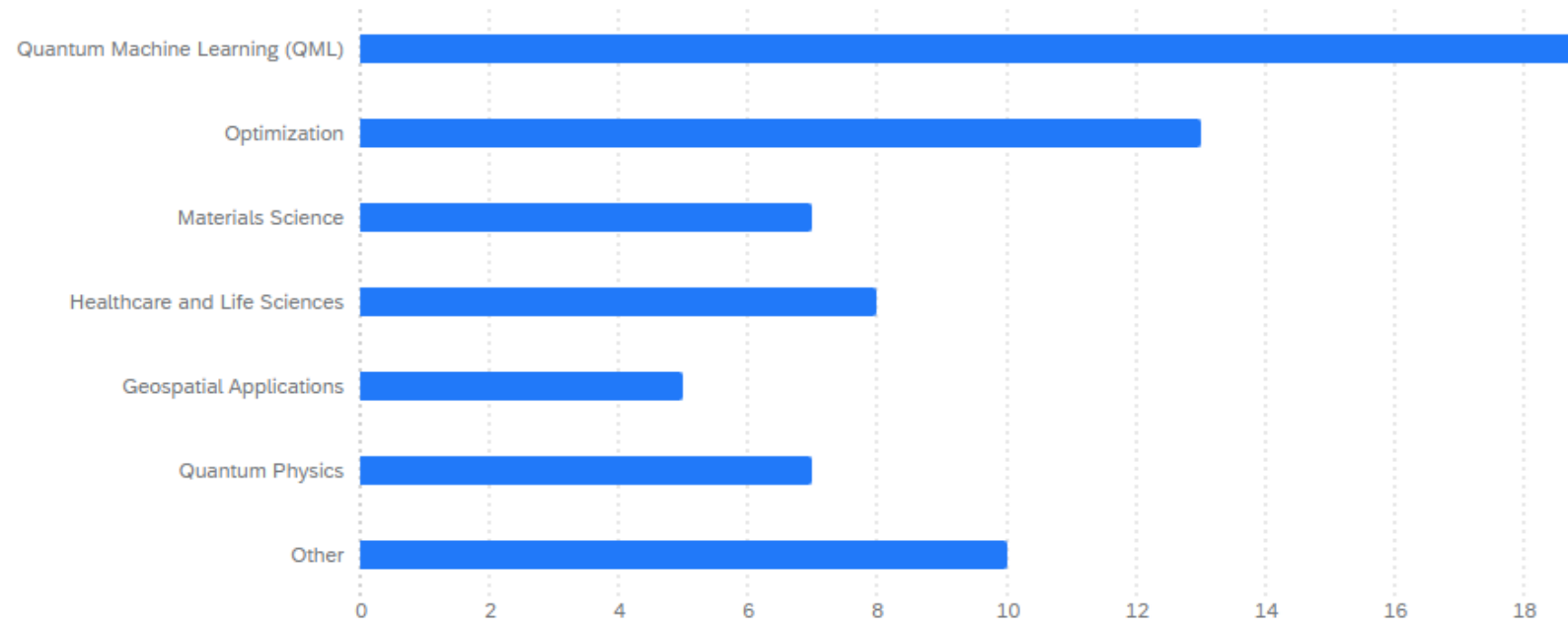
Electrical and Computer Engineering, UMKC  
[Meet Dr. Chowdhury](#)



**Clint Davis-Stober**

Psychological Sciences, Mizzou  
Optimization  
Quantum Machine Learning (QML)  
[Meet Dr. Davis-Stober](#)

Research Areas in Quantum (select all that apply)



<https://engineering.missouri.edu/quantum-innovation-center/affiliated-faculty/>

# We have a great journey to grow quantum community in 2025

## Key events for potential collaborations with MoHEIT community

1/16/2025: Kick-off meeting

2/24/2025: Qlearning Buddies Cohort 1 ★

2/26/2025: QTIC (Quantum Technology, Information, and Computing ) Student Organization ★

2/27/2025: Geospatial Quantum Day

4/30/2025: Mizzou QIC at Gateway to Innovation (G2I) in St. Louis

Spring 2025: NVIDIA, Q-CTRL, Quantinuum

**Summer 2025: Internship program** ★

6/23/2025: MSA Quantum Presentation

6/01/2025: IBM Quantum Partner's Meeting

7/10/2025: Quantum with MO State ★

7/16/2025: Collaboration with MOREnet – K-12 outreach ★

7/20/2025: Mizzou QIC and GPN Collaboration – SURF in South Dakota

7/24/2025: Scott Crowder, VP of IBM Quantum, Congressional Hearing

**9/18/2025: Mizzou Quantum Day** ★

9/23/2025: IBM QIC Summit in NYC

10/07/2025: Mizzou QIC at IBM TechXchange

10/21/2025: MOREnet Quantum Training ★

11/20/2025: Mizzou QIC at SC25 ★

11/24/2025: Quantum Graduate Certificate Development ★

11/25/2025: Classic and Quantum Computing Automation with IBM, Google, and NVIDIA

[Home](#) > [Our Mission](#) > [Genesis Mission](#)

# The Genesis Mission

A national initiative to build the world's most powerful scientific platform.



**The Genesis Mission unites DOE National Labs, industry, academia, and more to harness AI for breakthroughs in energy dominance, discovery science, and national security.**

## Missouri AI Talent Pipeline Advisory Committee

In service to Governor Kehoe's [Executive Order 26-02](#), the Missouri Department of Higher Education and Workforce Development (MDHEWD) has convened an AI Talent Pipeline Advisory Committee. This group is established to **evaluate Missouri's AI education and training ecosystem** and to **develop actionable recommendations** that prepare Missouri's workforce and education systems for the AI-driven economy.

### Membership and Meetings

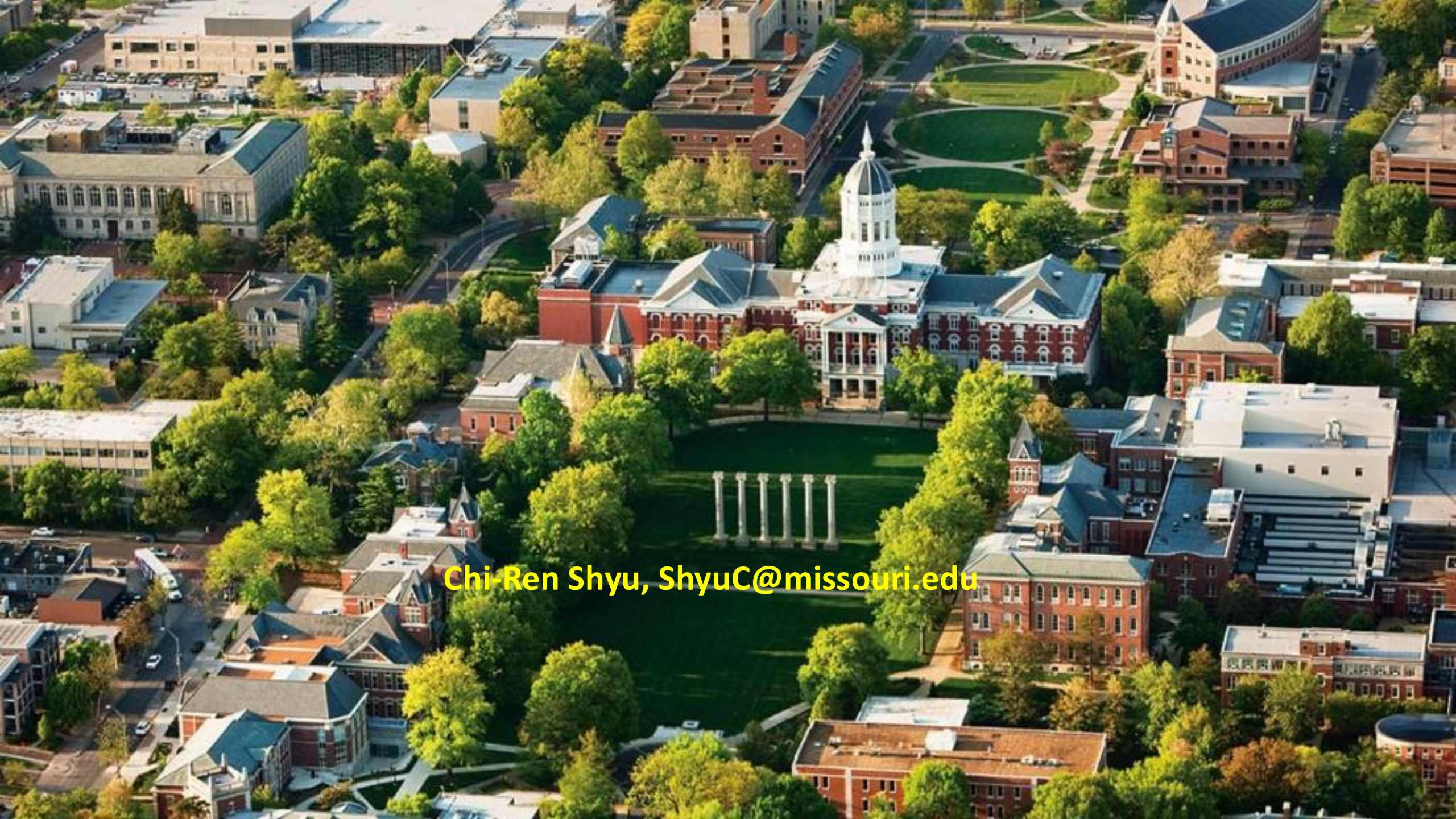
The initial Committee includes state agency representatives and AI experts from two- and four-year institutions, both public and private. The group is anticipated to convene in April, June, August and October with email communications in between gatherings. All meetings will be virtual except for the August meeting. That convening will be developed in partnership with the Department of Economic Development with invitations extended to members of the Governor's Office, workforce development leaders, and employer partners.

### General Work Plan & Timeline

As the committee reviews data and provides expertise, additional areas may be explored, and the specifics of the work plan may be adjusted.

SPRING (Apr-Jun)	SUMMER (Jul-Sep)	FALL (Oct-Nov)
<ul style="list-style-type: none"> <li>Examine AI education and training pathways</li> <li>Identify and analyze AI priority skill and competency frameworks</li> <li>Develop a gap analysis</li> </ul>	<ul style="list-style-type: none"> <li>Review labor market and industry needs</li> <li>Highlight institutional models</li> <li>Gather programs in development</li> <li>Examine regional differences</li> </ul>	<ul style="list-style-type: none"> <li>Develop policy, program, incentive, partnership, and other recommendations</li> <li>Provide feedback to draft report</li> </ul>

MDHEWD AI Talent Pipeline Advisory Committee		
Community Colleges		
Jefferson College	Dr. Chris DeGear	Vice President
Crowder College	Dr. Josh Carter	Associate Vice President
St. Charles	Dr. Kim Mecurio	Dean
Metropolitan CC	Dr. Drew Wilkerson	President, MCC-Online and Innovation
Public Four-Year Institutions		
Missouri Southern State University	Dr. Sarah Holtzen	Associate Professor
Northwest Missouri State University	Dr. Robert Voss	Associate Professor
Missouri Western State University	Dr. Elizabeth Kennedy	President
Missouri State University	Dr. Jason Jolley	Associate Dean
University of Missouri-Columbia	Dr. Chi-Ren Shyu	Professor
University of Missouri-Kansas City	Dr. Larry Wigger	Professor
Missouri S&T	Dr. Don Wunsch Dr. Amaury Lendasse Dr. Peggy Lindner	Director, Kummer Institute Department Chair Associate Professor
University of Missouri-St. Louis	Dr. Vivek Kumar Singh	Assistant Professor
University of Central Missouri	Dr. Tim Crowley	Provost
Truman State University	Donna Liss	Chief Information Officer
Private Four-Year Institutions		
Lindenwood University	Dr. James Hutson	Professor
Central Methodist University	Carrie Stodtman	Director of Digital Learning
Missouri Baptist University	Dr. Melanie Bishop	Vice President
Washington University	Dr. Dennis Zhang	Professor
Columbia College	Dr. Toby Arquette	President
College of the Ozarks	Dr. J. Bryan Osborne	Associate Professor
Park University	James Nelson	Chief Information Officer



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