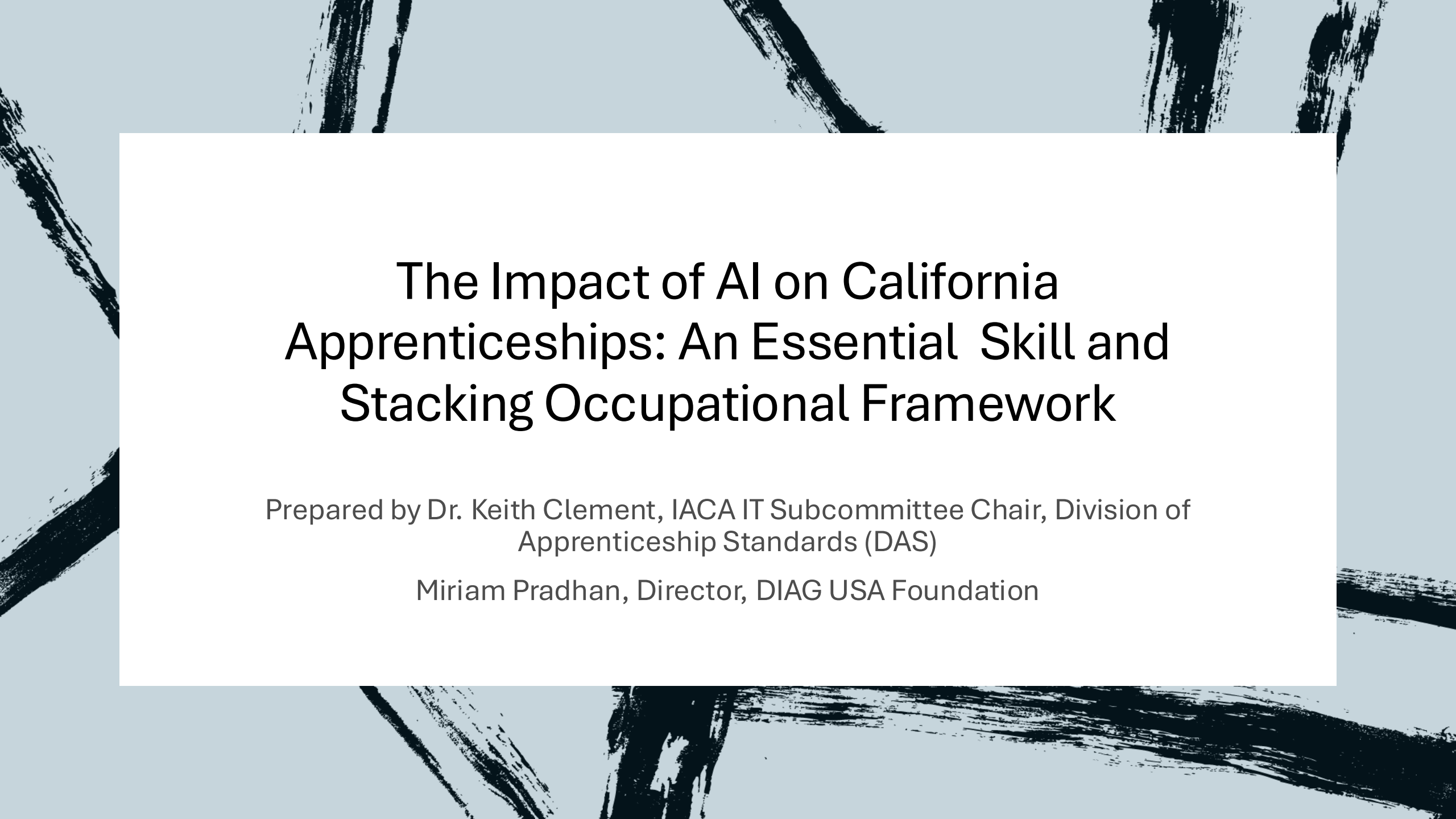




The Impact of AI on California Apprenticeships: An Essential Skill and Stacking Occupational Framework

Prepared by Dr. Keith Clement, IACA IT Subcommittee Chair, Division of
Apprenticeship Standards (DAS)

Miriam Pradhan, Director, DIAG USA Foundation

AI Impacts California Apprentices in Many Ways

1. Transformative and/or Disruptive impact on current and future workplace & workforce.

2. AI “Soft Skills” elevated to “Essential Skills” across many industry sectors and occupations. Human Centric and Technical Skills

3. Preparation Process: Creation & Alignment of AI Pre-Apprenticeship and Registered Apprenticeship Pathways to serve numerous IACA Subcommittees.

4. AI impacting all levels of the career ladder (from entry level to executive roles); Occupational Stacking AI Apprenticeship Framework for these work roles.

Slide deck Structure & Organization

1. Context: How AI is Impacting the current and future workplace/workforce.

2. What are key AI Essential Skill Sets that are common across sectors & occupations?

3. Development of Aligned Pre-Apprenticeship & Registered Apprenticeship Pathways.

4. Occupational Skill Stacking Framework: AI Work Roles at All Levels of the Career Ladder

Context: AI Impact on the Current & Future Workplace & Workforce

AI is impacting social, economic, political, and cultural issues worldwide and in real time.

AI Impacting Current and Future Workplace

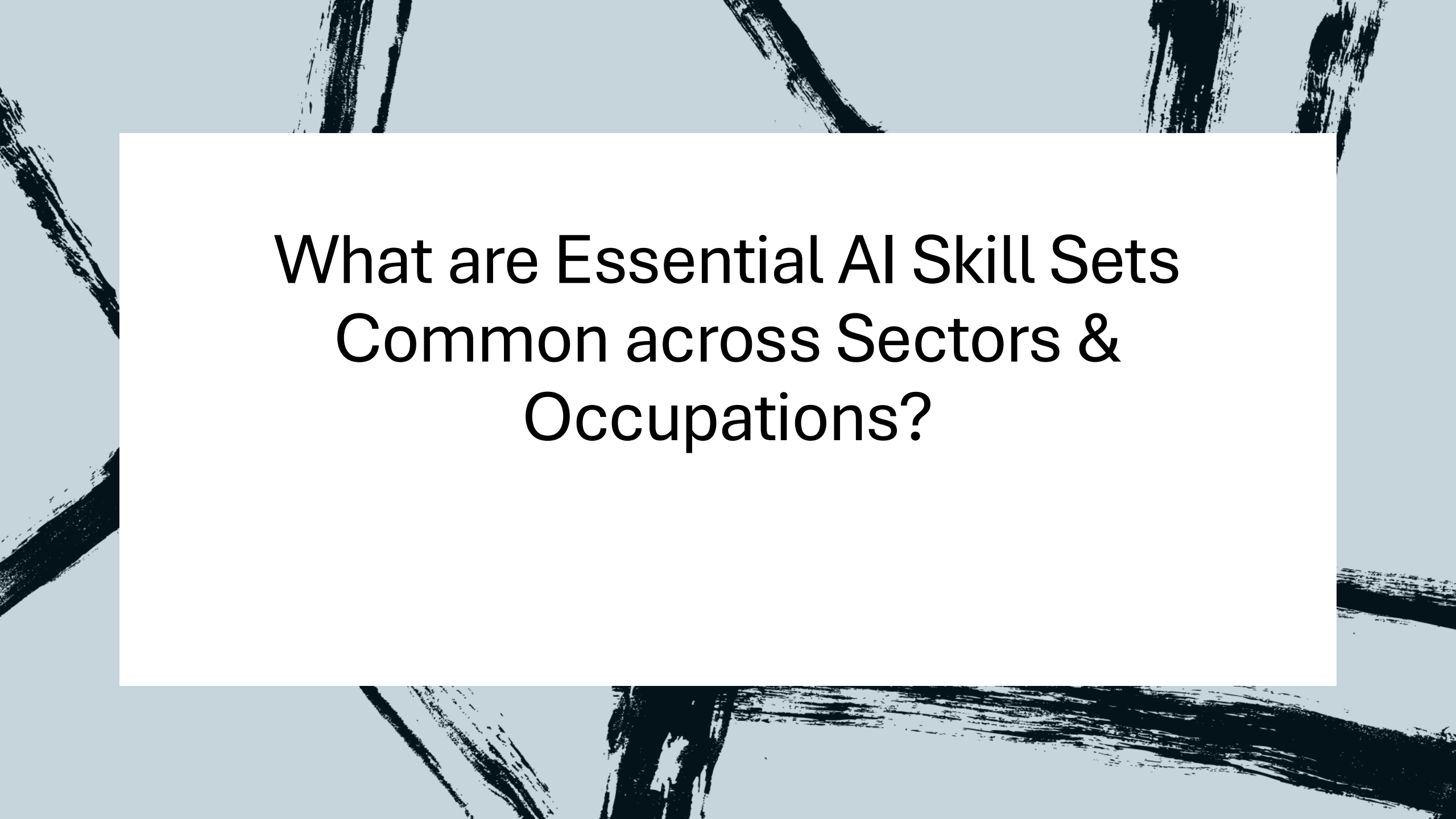
- The nature of workplace is changing due to innovative emerging and applied technology like AI, cybersecurity, and remote work.
- Job descriptions and work roles are being redefined; routine positions or with many machine-based tasks are increasingly replaced by AI.
- Entry level work roles are often affected.
- AI is impacting all levels of the career ladder from entry level, intermediate, advanced, and executive positions.
- It is critical that AI is reflected in modern education, training, and workforce preparation and not to be ignored. Pandora's box is open. **We must prepare the workforce for the jobs of the future.**

AI Impacting Current and Future Workforce

- Trillions of dollars invested in recent years to develop AI hardware (chips), data centers, and apps/software is significantly impacting the global economy and markets.
- Changing nature of jobs, duties, and tasks due to growing utilization of AI in the workplace across industry sectors.
- The way we prepare and educate the future workforce must keep up with the evolving tech nature of the workplace.
- Workforce Development Knowledge, Skills, Abilities, and Competencies (KSACs) are changing in many sectors.
- Workforce Preparation process is changing with AI-Education, Industry Certifications, RTI, and on the Job Training (OJT).
- We need to align AI KSACs into Pre- and Registered Apprentices Pathways.
- AI skills and competencies are being elevated to “Essential Skills” needed across industry sectors and throughout the career ladder.

AI Workforce and Labor Market Demand

- AI is fueling a global technology revolution and continuing to innovate and evolve since the release of Chat GPT & generative AI (2022).
- Demand for AI workers surged 61%-68% year over year globally. US hotspots include Silicon Valley and Los Angeles.
- The world faces a 50% hiring gap because supply cannot keep pace with employer needs (LinkedIn).
- 1 in 4 new tech jobs explicitly require AI skills. AI skills appear in 1.8% of all US job postings (LinkedIn)
- Grew from 3% to 6% of all job fills in one year (Magnit)
- The key is skilling/reskilling people through the registered apprenticeship model.
- So, what are key AI skills and literacy?



What are Essential AI Skill Sets Common across Sectors & Occupations?

ACT Responsibly Framework (Google)

To mitigate bias and utilize AI tools responsibly, follow the **ACT Responsibly** framework:

- A – Ask

Ask if this task is appropriate for AI. Start with low-stakes, repetitive tasks. Reconsider using AI when the task involves confidential data, high-stakes empathy, or “final” decision-making. AI should assist humans, not replace them.

- C – Check

Check AI-generated outputs before using them. Always verify facts when extracting insights. Review the output for:

- Accuracy: Use reliable sources to confirm statistics.
- Bias: Ensure the content is fair and representative of your community.
- Mission Alignment: Ensure the tone matches the audience or target task, e.g. your organization’s authentic voice.

- T – Tell

Tell people when you use AI. Transparency is the idea that you should be open about how a tool was used. Disclose to your stakeholders when content was drafted by AI and always take responsibility for the final output.

Core AI Competencies for Registered Apprenticeships (Google)

- **AI Fundamentals and Literacy**
 - Understand basic AI concepts, capabilities, limitations, and common workplace applications.
 - Recognize how AI augments human work, supports decision-making, and improves productivity.
- **AI Tool Awareness and Selection (Digital and Information Literacy)**
 - Identify appropriate AI tools for specific job tasks and workplace needs.
 - Evaluate AI tools based on functionality, reliability, security, and organizational requirements.
- **Prompting and Effective AI Use (Human centric use of AI)**
 - Develop effective prompts and instructions to generate useful, relevant, and accurate outputs.
 - Use AI tools to support research, communication, problem-solving, documentation, and other occupation-specific tasks.
- **Critical Evaluation and Human Oversight (Critical Thinking Skills)**
 - Assess AI-generated content for accuracy, quality, relevance, bias, and completeness.
 - Apply professional judgment and maintain human accountability for decisions and work products.
- **Responsible and Ethical AI Use (Ethical use of AI & Equity and bias – ensure equal access)**
 - Understand ethical considerations related to AI, including fairness, transparency, bias, and responsible workplace use.
 - Follow organizational policies and industry standards governing AI use.
- **Data Privacy, Security, and Compliance**
 - Protect confidential, proprietary, and personally identifiable information when using AI tools.
 - Apply cybersecurity, privacy, and data governance practices consistent with employer and regulatory requirements.
- **AI-Enabled Problem Solving and Innovation**
 - Use AI to improve workflows, increase efficiency, automate routine tasks, and support continuous improvement.
 - Identify opportunities to apply AI tools to occupation-specific challenges and business processes.
- **Adaptability and Continuous Learning**
 - Stay informed about emerging AI technologies and evolving workplace applications.
 - Demonstrate a willingness to learn, evaluate, and responsibly adopt new AI-enabled tools and practices.

AI Skill and Competency Areas

AI Awareness &
Literacy

Digital and
Information
Literacy

Critical Thinking
Skills

Data and
analytical
competencies-
data science

Equity and bias-
ensure equal
access

Ethical use of AI

Human centric
use of AI

AI in a growing
number of work
processes

Key Human-Centric AI Skills

Critical Thinking and Evaluation: Validating, auditing, and questioning AI-generated content to ensure accuracy and reduce bias.

AI Ethics and Governance: Managing data privacy, bias, and responsible AI usage.

Creativity & Contextual Reasoning: Applying human perspective to complex problems that AI cannot fully replicate.

Adaptability & Continuous Learning: Staying updated with rapid AI advancements and changing technologies.

Collaboration & Communication: Working alongside AI tools and effectively communicating AI-driven insights.

Key Technical Skills

Prompt Engineering:
Crafting precise, effective queries to maximize GenAI output quality.

Data Analysis: Handling, interpreting, and querying data to make informed, AI-driven decisions.

Programming: Proficiency in languages like Python or JavaScript for building and maintaining AI systems

Machine Learning/Algorithms:
Understanding the core concepts and functionality of AI models.

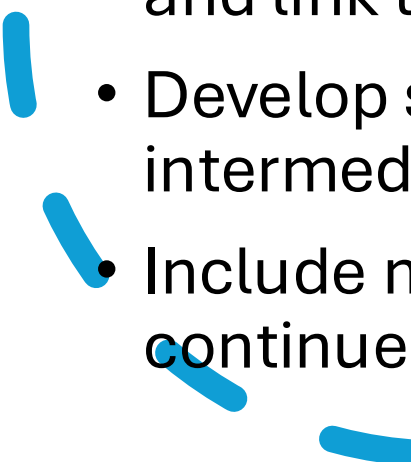
Cloud Computing Basics:
Familiarity with platforms that host AI services.



Alignment & Development of Pre- Apprenticeship and Registered Apprenticeship Pathways



AI Apprenticeship Pathways

- We need to align AI KSACs into pre-apprenticeships and registered apprenticeships and build a pathway.
 - Engage with employers to determine current skills and competencies needed on the job.
 - Build out Related Training Instruction (RTI) for stacking apprenticeship and link to OJT occupational frameworks.
 - Develop stacking apprenticeship programs for high demand entry level, intermediate level, and advanced level AI work roles.
 - Include mechanisms to update occupational frameworks as AI continues to evolve and mature dynamically.
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Apprenticeship Pathway Architecture

- AI Pre Apprenticeships (basic AI literacy)
- Domain specific knowledge
- AI Stacking Registered Apprenticeships
 - Entry level work roles
 - Intermediate level work roles
 - Advanced level work roles



Stacking AI Work Roles and Domain Experience

AI is impacting all industry sectors and occupational clusters.
Thus, AI is affecting all domains and must be included in future workforce preparation.

AI Jobs and Developing Domain Experience

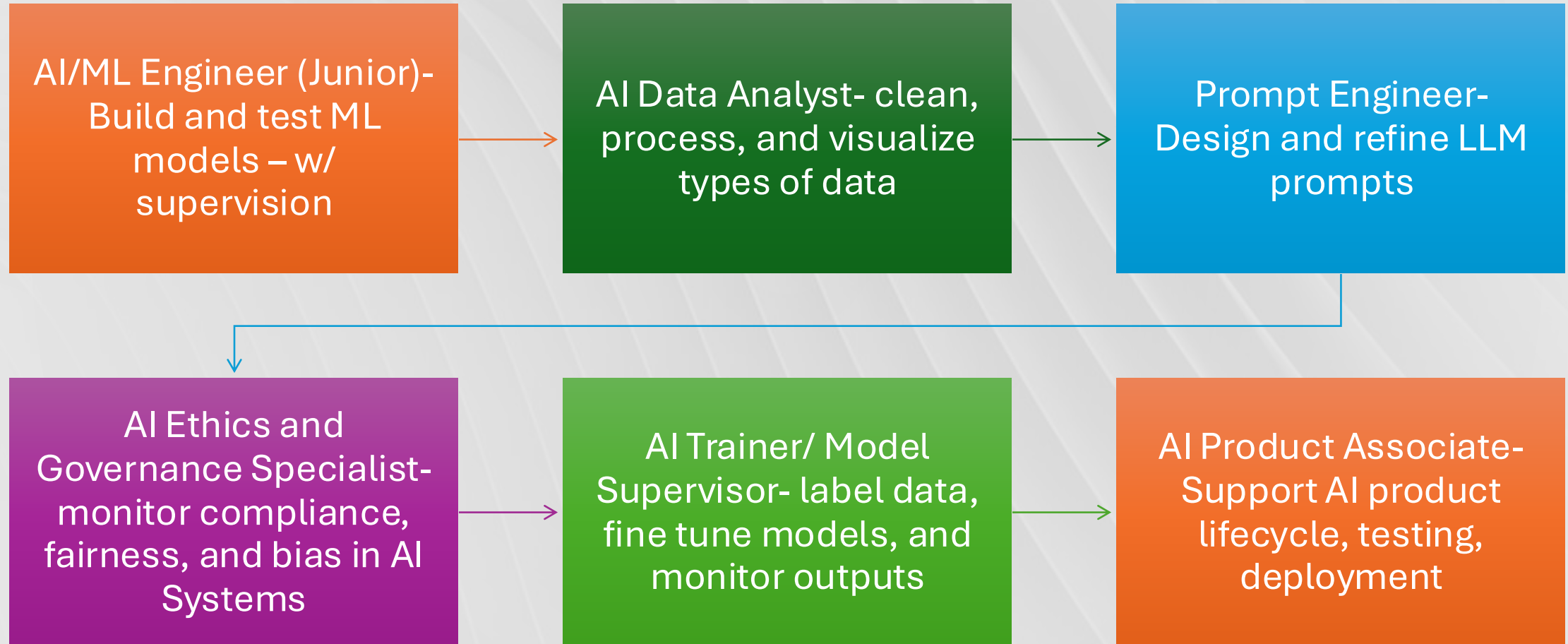
- The next few pages provide a list of AI jobs at all levels of the career ladder.
- Entry Level Positions in AI
- Intermediate Level Positions in AI
- Advanced Level Positions in AI
- **AND, Domain Experience in many Key Sectors and Policy areas**
- Advanced Manufacturing, Education, Healthcare, Equal Employment Opportunity, Homeless & Foster Youth, Information Technology, People with Disabilities, and Public Sector



AI Critical across All Domains

- Skills are needed universally across public & private sector:
 - Ethical use of AI
 - Responsible use of AI Shadow AI
 - Correct use of data (i.e. no PPI)
 - Critical thinking
 - AI Tools Utilization
 - AI Model Utilization
 - Mindfulness- Emotional Intelligence, stress mitigation
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Entry-Level AI Jobs



Intermediate-Level AI Jobs

AI/ML Engineer
(Intermediate)

Data Scientist

AI Ethics and
Compliance
Analyst

AI Product
Manager
(Associate)

Natural Language
Processing (NLP)
Specialist

Synthetic Data
Engineer

Advanced-Level AI Jobs

AI Research
Scientist

AI Solutions
Architect

Machine
Learning
Engineer (Senior)

AI Ethics Lead

AI Product
Manager (Senior)

AI Data Scientist
(Senior)

AI Security
Specialist

In Conclusion

- AI literacy is a baseline KSAC in a modern and technical society.
- It is used daily at all levels of the career ladder, by students, and in our personal lives.
- AI is changing the nature of work roles and job preparation.
- The Apprenticeship model is ideal for preparing the AI workforce.
- We need to develop guardrails to ensure that AI serves humans and protects sovereignty and not the other way around.

Questions, Comments, and Suggestions

- This is a work in progress. Suggestions are welcome.
- If you have any questions or comments, please reach out to Dr. Keith Clement, IACA IT Subcommittee Chair
- kclement@mail.fresnostate.edu
- Miriam Pradhan, Director, DIAG USA Foundation
- mfarnbauer@digausa.org