Hello!

- My name is Bill Curtis-Davidson, Sr. Consultant, Wheelhouse Group
- Co-Director, Partnership on Employment & Accessible Technology (PEAT)
  - PEAT is funded by the U.S. Department of Labor’s Office of Disability Employment Policy (ODEP)
  - We convene multiple stakeholders to advance emerging tech accessibility and increase employment opportunities for people with disabilities.
- Learn More: PEATworks.org

Please Note

- PEAT material does not necessarily reflect the views or policies of the Office of Disability Employment Policy, U.S. Department of Labor
- Nor does the mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.
- Examples of AI-enabled technologies shown in this webinar are for illustration purposes only.
Learning Objectives
At the end of this session, you should understand:
• Key concepts and capabilities of AI-enabled tech
• How AI-enabled tech is being used in workplaces (and examples)
• AI fairness and disability employment policy activities
• Industry efforts on AI fairness and equity for people with disabilities
• Ways PEAT is helping convene communities
• Where to find resources and contacts

Key Concepts & Capabilities of AI-Enabled Technology
AI Fairness for People with Disabilities in Workplace Tech

What is AI?
• Simulation of human intelligence in machines programmed to think like humans and mimic their actions.
• Learns from experience, adjust to new inputs, and perform human-like tasks.
• Automates repetitive learning and discovery through data by performing frequent, high-volume, computerized tasks.
General Types of AI

- **Artificial Narrow Intelligence (ANI):** Systems that can only perform a specific task autonomously, using human-like capabilities. Most AI today fits into this category.
- **Artificial General Intelligence (AGI):** Has human-like intelligence that can apply its mind to many different tasks. This type of AI is the subject of much research today.
- **Artificial Super-Intelligence (ASI):** Exceeds human beings in most or all respects. AI skeptics warn of the danger to humanity, but others hope this type will solve humanity’s big problems like climate change, poverty and disease.

Key Components of AI

- **Natural Language Processing (NLP)** enables AI to communicate successfully with humans.
- **Knowledge Representation** acts as AI’s memory.
- **Datasets** are used to train a machine learning model, validate its accuracy and store new information.
- **Machine Learning (ML) Algorithms** are sequences of “if, then” questions – designed by people and relying on datasets – that allow AI to detect patterns, adapt to new circumstances and make decisions automatically.
- **Automated Reasoning** enables AI to use stored information to both answer questions and draw new conclusions.

AI’s Workplace Promise & Potential

Software can learn to process images, sounds, and linguistic expressions, which benefits people with disabilities at work:

- **Computer vision**
  - Facial, body, gesture, image recognition
  - Autonomous vehicles
- **Speech systems**
  - ASR/Real-time auto captioning, TTS, Voice UIs
- **Text processing systems**
  - Automatic text reading / summarization
- **Chatbots and conversational agents**

Accessible Technology Webinar Series
Artificial Intelligence (AI) Fairness for Persons with Disabilities in Workplace Technologies
January 21, 2021
Poll Question #1
Are you familiar with issues related to AI fairness for people with disabilities?
1-Yes
2-No

Examples of AI-Enabled Tech in the Workplace
AI Fairness for People with Disabilities in Workplace Tech

Al’s Increased Use in the Workplace
• Job searching and finding work
• Recruiting talent, screening interviewing, hiring
• Onboarding, training and development
• Physical site navigation
• Communication, collaboration and productivity
• Personalized accommodations / assistive technology
• Health, wellness and safety
• Work optimization, performance evaluation, and promotions
• Digital assistants

Images: Yvette W (Pixabay), Tinalill Hansen (Pixabay)
AI-Enabled Tech: Job Searching

- **Key Functionality**
  - Creating candidate profiles
  - Matching candidates with opportunities
  - Applying for specific jobs

- **Challenges for People with Disabilities**
  - Building inclusive profiles
  - Capturing skills, knowledge, strengths, personality, environmental preferences
  - Respecting privacy and self-disclosure

AI-Enabled Tech: Recruiting, Screening, Hiring

- **Key Functionality**
  - Worker sourcing, predictive matching, and recruiting
  - Job candidate screening (chatbots, testing)
  - Interviewing job candidates (chatbots, video)
  - Job candidate selection (predictive fit with desired employee characteristics)

- **Challenges for People with Disabilities**
  - Automated inference of / disclosure of disability status
  - Lack of multi-modal options
  - Profiling and popularity metrics unfair to outliers
  - Screening out candidates based on speech, facial / emotion recognition, sentiment analysis, competence/psychometric tests

Recruiting Tool: Mentra

- Matches neurodiverse job-seekers with employers and opportunities
- Future of Work Podcast
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AI-Enabled Tech: Onboarding & Training

- **Key Functionality**
  - Completing onboarding, policy and procedures documents
  - Job simulation (e.g., virtual/augmented reality, sensory algorithms)
  - Training personalization via predictive tailoring, roleplay, practice
  - Automated collection of worker data

- **Challenges for People with Disabilities**
  - Learning analytics fairness (behavior, personality, response tests)
  - Inaccessible training interfaces
  - Misfit for ongoing machine learning, inaccurate assessment of learner needs, preferences, skills and potential

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**Training Tool: STRIVR**

- Learners get on-demand access to real-world scenarios in a safe environment (virtual reality).
- Businesses gain unique insights to assess performance and impact.
- [Podcast: “Value of VR for Training and Employee Development”](#)

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**Training Tool: Honeywell**

- Augmented reality training conveys knowledge from older workers to younger learners.
- Simulations and in situ guidance in different areas of operational practice (e.g., installation, configuration, inspection, maintenance, part replacement, troubleshooting).
- [Honeywell Connected Plant](#)
Training Tool: Filtered Magpie

- Algorithmic system employs a chatbot to interact with employees in order to collect information and to identify skills gaps among employees.

AI-Enabled Tech: Physical Site Navigation

- Key Functionality
  - Perception of current location and environment
  - Outdoor and indoor navigation between locations
  - Determination of traffic and crowds (important for social distancing)
  - Crowdsourcing amenities, points of interests (POIs), hazards, routes, path features, etc.

- Challenges for People with Disabilities
  - Perception, interactions and UI that doesn't rely on user ability
  - Accessibility considerations and preferences in routing, POIs, etc.

Navigation Tool: Aira

- Service that connects blind and low-vision people to highly trained, remotely-located agents.
- Delivers instant access to visual information – helping users navigate the world and perform tasks that require sight.
- How Aira Works
Navigation Tool: MapInHood

- Crowd sourcing and AI powered app provides personalized navigation and actionable data in real time for safe, accessible and convenient trips.
- Focuses on personalization to support pedestrians with disabilities including social distance mode
- Microsoft AI for Accessibility award (MapInHood Article)

AI-Enabled Tech: Communication/Collaboration

- Key Functionality
  - Automatic speech recognition / transcription / note taking
  - Communication translations (e.g. speech, text, sign language, etc.)
  - Collaborative notes, comments, etc.
  - Virtual meeting platforms and in-meeting digital assistance
- Challenges for People with Disabilities
  - Supporting multimodal 2-way synchronous and asynchronous communication
  - Handling diverse speech / having a non-speech mode
  - Accessible user interfaces and interaction modes

Collaboration Tool: WebEx

- AI-enabled “voice intelligence” in Webex Meetings
- Voice commands/digital in-meeting assistant
- Real-time transcription notes, transcript search
- Closed captioning
- Meeting highlights / action items
- WebEx Meetings Voice Intelligence
- UTC Today “Cognitive Collaboration”
Collaboration Tool: Fireflies

- AI-enabled meeting/collaboration tool
- Record, transcribe, collaborate, and search across action items and other important highlights
- Fireflies.ai

Communication: ASL - Speech

- Working prototype created as part of Verizon and NYC Media Lab’s Connected Futures III challenge.
- Led by NYU student, Zhongheng Li.
- Uses machine learning/augmented reality to enable hearing people to understand sign language and turns spoken words into sign language for people who are deaf.
- Vice Article on this project

Communication: Project Understood

- Teaching Google to understand people with Down syndrome, one voice at a time.
- Collaboration between Canadian Down Syndrome Society and Google
- Collecting voice samples from adult Down syndrome community to create a database that can help train Google’s technology to better understand people with Down syndrome.
- ProjectUnderstood.ca

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AI-Enabled Tech: Accommodations/Assistive Tech

- **Key Functionality**
  - Narrow to more robust technologies specifically used as assistive tech
  - Computer vision
  - Multimodal communication tools

- **Challenges for People with Disabilities**
  - Introducing emerging technologies in controlled IT environments
  - Bring your own device / tool vs. provisioning by employer
  - Ensuring personal and professional data privacy and security

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Assistive Tech Tool: Seeing AI

- Harnesses AI to open up the visual world through audio descriptions.
- Microsoft designed this app for people who are blind / people with low vision
- Uses computer vision and AI to read short text, documents, product labels, currency, color, handwriting, images in other apps like email
- Detects light, identifies people and describes environments/scenes

**Seeing AI Images**: Microsoft Seeing AI

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AI-Enabled Tech: Health, Wellness & Safety

- **Key Functionality**
  - Centralizing company-specific and third-party resources
  - Data-driven, personalized UX, health care recommendations, real-time guides
  - Wellness tool integrations (e.g., mobile apps, IoT, wearables, etc.)
  - Therapeutic / mental health chatbots
  - Safety and emergency support

- **Challenges for People with Disabilities**
  - Accessible user experience and interfaces across systems
  - Supporting multimodal communication / language processing
  - Inaccurate sentiment / emotion / situational analysis

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Health/Wellness Tool: Wysa

- AI-based ‘emotionally intelligent’ chat platform
- Combines AI chat, digital self-help, expert human direct support
- Aims to help people manage stress, anxiety, self-care
- Uses evidence-based cognitive-behavioral techniques (CBT), DBT, meditation, breathing, yoga, motivational interviewing, and micro-actions
- wysa.io

AI-Enabled Tech: Work Optimization

- Key Functionality
  - Workplace optimization based on data
  - Incentives to ignore difficult clients/employees
  - Evaluation and “productivity scoring” based on work surveillance
  - Promotion recommendations based on productivity & efficiency metrics
  - Analysis to assign and address responsibility based on dominant patterns
  - Producing justification for severance or termination

- Challenges for People with Disabilities
  - Supporting diverse employees' diverse work styles
  - Having diverse ways to measure productivity

Optimization Tool: Humanyze

- Using AI to help employers understand how work gets done.
- Connects corporate data to actionable metrics, indicators, and algorithms
- Objective measurement of the workday (remote work, in-person, workday length)
- Employee anonymity, addressing bias for DEI initiatives
- Learn: Humanyze Knowledge Hub

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AI-Enabled Tech: Digital Assistants

- **Key Functionality**
  - Conversational UI helps employees find resources, get support, complete docs.
  - Speaks multiple languages, learns business logic/workflows,
  - Human-like interactions including adaptive social tone, context switching, multi intent recognition, interruptions, digressions and more.
  - Machine learning improves intent recognition, abandonment, escalation rates.

- **Challenges for People with Disabilities**
  - Supporting multimodal communication
  - Handling diverse speech / having a non-speech mode
  - Accessible user interfaces and interaction modes

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Digital Assistant: Amelia

- Example of a Market-Leading Conversational AI
- Platform includes a “Digital Employee Builder” allows organizations to develop different assistants for different use cases.
- Amelia Hyperautomation Platform

Images: IPSoft

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Digital Assistant: Nadia

- Innovative example of value of co-design with people with disabilities
- Digital human was to support services delivery at Australia National Disability Insurance Scheme.
- Co-created by Marie Johnson, CEO of the Centre for Digital Business, the project never launched.
- Aimed to help users navigate rigid world of structured websites, forms, channels, call centers, defined hours, complex language.
- Article: “Human Conversations and Digital Humans ~ Not Just a Pretty Face”
- Video: “ Becoming Nadia”

Images: Marie Johnson / Centre for Digital Business
Poll Question #2
Do you personally use AI-enabled tools in your own workplace?

1-Yes
2-No

AI Fairness & Employment Policy Activities
AI Fairness for People with Disabilities in Workplace Tech

Nondiscrimination is Still the Law

- Title I of the ADA prohibits “covered employers” from discriminating against qualified individuals with disabilities in employment.
- The U.S. Department of Justice has taken the clear and unequivocal position that the ADA covers Internet website access, mobile applications, and other forms of ICT.
- It seems logical that emerging technologies like AI used in the context of employment would be subject to the nondiscrimination provisions of the ADA.

Learn more: www.peatworks.org

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Key Policy Resources
- U.S. DOL/ODEP: EARN, Use of AI to Facilitate Employment Opportunities for People with Disabilities
- U.S. DOL/ODEP: EARN / PEAT, Checklist for Employers: Facilitating the Hiring of People with Disabilities Through Use of eRecruiting Screening Systems, Including AI

EARN’s Recommended Practices for Buyers
- Make a commitment to design and purchase AI recruitment products that do not impede hiring qualified job candidates with disabilities
- Collect data and conduct audits to ascertain whether AI designed, purchased, or under consideration for purchase screens out or tends to screen out people with disabilities
- Include indemnification clauses in contracts with vendors, requiring vendors to document that they do not use proxies or models that screen out (or tend to screen out) qualified job candidates with disabilities
- Foster practices for technology procurement that reflect Universal Design, accessibility features and assistive tech support and services to improve job performance for workers with disabilities who need accommodations

Advocacy by Civil Rights Groups
- Nondiscrimination. Hiring assessments should not discriminate based on protected characteristics such as race, color, ethnicity, religion, national origin, sex, gender identity, sexual orientation, age, familial status, disability, or genetic information.
- Job-Relatedness. Hiring assessments should measure traits and skills that are important to job performance.
- Notice and Explanation. Applicants should be meaningfully notified about how they will be assessed so they can seek redress under existing civil rights protections or request a reasonable accommodation.

Source: U.S. DOL/ODEP: EARN, Use of AI to Facilitate Employment Opportunities for People with Disabilities
Source: The Leadership Conference Education Fund: Civil Rights Principles for Hiring Assessment Technologies (July 2020)
Advocacy by Civil Rights Groups, Cont’d

- **Auditing**: Hiring assessments should be thoroughly and regularly audited before and after deployment for discrimination and job-relatedness.
- **Oversight and Accountability**: Federal and state policymakers should develop new legal and technical standards and equip state and federal regulators with the ability to meaningfully investigate and hold organizations accountable for ensuring equal opportunity in their use of hiring assessments.

Source: The Leadership Conference Education Fund: Civil Rights Principles for Hiring Assessment Technologies (July 2020)

Selected Federal Government AI Activities

**National AI Initiative.** On January 12, 2021, the White House OSTP launched a national AI initiative after the National Defense Authorization Act 2021 was signed into law (see a [summary of the law](#) with many references to AI ethics).

**Presidential Innovation Fellow.** Maria Patterson, an astrophysicist turned tech innovator advancing equity with inclusive STEM communities, began working with US DOI/ODEP to work on developing protocols to help ensure HR-related AI tools are not unintentionally biased against job seekers and employees with disabilities.

Industry Efforts on AI fairness and Equity for People with Disabilities

AI Fairness for People with Disabilities in Workplace Tech
Research Viewpoint – AI & Accessibility

Meredith Ringel Morris of Microsoft, outlined 7 key challenges related to AI fairness for people with disabilities:

- **Inclusivity** – Has the tech been designed in an inclusive way and is it effective for diverse user populations?
- **Bias** – Does the tech exacerbate disability-based discrimination?
- **Privacy** – Are the privacy risks for people with disabilities amplified by the tech?
- **Error** – Can people with disabilities trust the tech, rely on the error metrics used?
- **Expectation Setting** – Have unreasonable expectations been set for the tech?
- **Simulated Data** – Has the use of simulated data been avoided, instead using inclusive data sets that better represent people with disabilities?
- **Social Acceptability** – What is socially acceptable to people with disabilities?

Source: Communications of the ACM, Vol. 63 No. 6, June 2020

Report – Center for Democracy & Technology

Recent report specifically about algorithm-driven hiring tools offers valuable perspectives about tradeoffs in innovation vs. potential negative effects:

- Highlights how hiring tools may affect people with disabilities
- Legal liability employers may face for using such tools
- Concrete steps for employers and vendors to mitigate some of the most significant areas of concern.
- Serve as a resource for advocates, regulators, and those deciding whether to develop or use these tools to consider the risks of discrimination, and ultimately to ask if the tools are appropriate for use at all.

Access the full report and plain language report.

Source: “Algorithm-driven Hiring Tools: Innovative Recruitment or Expedited Disability Discrimination?”, Center for Democracy & Technology, December 3, 2020

Understanding the Stages of AI Bias

- Unwanted bias places privileged groups at systemic advantage and unprivileged groups at systemic disadvantage, and it can proliferate in your data and your AI.
- Biases can be baked into AI-enabled tech during different stages:
  - Data gathering
  - Processing of data
  - Analysis and interpretation of data
  - Training or machine learning process
  - Decisions based on data
Different Types of Bias in AI

- Data gaps, misrepresentation, lack of representation
  - Excluded from studies
  - Absent from digital traces
  - Inaccurate data proxies
- Embedded bias and engineered bias
  - Patterns of discrimination reflected in data
  - Bias of developers designing the system
  - Algorithmic bias
- Statistics and the edges
  - Prediction and probability based on statistical significance or power
  - Focused on the majority or average

Project We Count
Led by OCAD University’s Inclusive Design Research Centre, We Count is a community-driven project to help:
- Provide access to shaping data science.
- Address data gaps and biases.
- Co-design protections against data abuse and misuse.
- Co-create more equitable decision supports.

Learn more: WeCount.InclusiveDesign.ca

Considerations When Developing AI

- What data was used?
- How was the data processed?
- What classification was used?
- How were data gaps addressed?
- What were the assumptions applied in the analysis?
- Is the learning model adaptive and what data will it use for adaptation?
- What decisions will it support, how is this delegated?
- How are errors processed?
- How can the tool be refined, and bugs fixed?
Questions for Talent Acquisition SW Vendors

- Do tests evaluate factors that specifically relate to the particular jobs in question?
- What data do we need to analyze our job positions?
- Can we view the specific factors and the weight of each? Can these be customized?
- Can we view at the specific factors & decision-making process that led to each decision?
- How do you test for bias and how often do you validate?
- Did the design team and user testers include people with disabilities and other diverse lived experiences?
- Are candidates well enough informed about the process to determine if they should request an accommodation?
- Is a meaningful accommodation available, and can it be given equal weight when evaluating candidates?

Ethical AI Requires a Culture Change

- Emphasize need for Diverse and Inclusive teams.
- Incorporate Ethics in Design Thinking.
- Red-Team vs Blue-Team tactics to stress test assumptions of AI.
- AI Advocacy Ambassador program.
- Feedback loops.
- Teach unconscious bias and how it relates to data and work product.
- Focus on Human-Friendly Automation.

PEAT’s Efforts to Convene Communities

AI Fairness for People with Disabilities in Workplace Tech
**Convening Communities**

- Disability rights advocates
- Policymakers and researchers
- Industry associations
- Employers
- AI technology platform companies
- AI application developers including startups
- Accessibility / inclusive design consultants
- Employment / accommodation specialists

**PEAT 2020 Think Tank Attendees’ Input**

- Startups and investors need exposure to the business case for accessibility
- Emerging technologies such as AI and extended reality (XR) are changing and impacting the virtual workplace, and they present unique challenges for people with disabilities (PWDs)
- We need to infuse the experiences and insight of PWDs into the emerging technology ecosystem to educate both startups and investors about the business imperative of accessibility

*The Virtual Workplace: PEAT Priorities and Next Steps* | October 2020

**Featured Initiative**

- Start Access

  Collaboration among multiple stakeholders to better enable startups to adopt inclusive design, develop innovative products and meet a huge unmet market need

  - Framework and resources for inclusive design specifically for startups
  - Advocate for and advance fairness for people with disabilities in AI-enabled talent acquisition and technologies
  - Scaling AI fairness to enable post COVID-19 workplace recovery