

WEBVTT

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00:00:04.810 --> 00:00:17.639

Kari D. Weaver (she/her): Good morning! I am sorry that I cannot be with all of you today in Ottawa, but I am delighted to join you in this pre-recorded presentation.

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00:00:17.770 --> 00:00:20.539

Kari D. Weaver (she/her): Give me just a moment.

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00:00:22.790 --> 00:00:41.580

Kari D. Weaver (she/her): I'm Carrie Weaver. I'm currently the program manager of the Artificial Intelligence and Machine Learning Initiative with the Ontario Council of University Libraries. And I'm delighted to join you today to speak about artificial intelligence and research journeys.

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00:00:41.580 --> 00:00:50.790

Kari D. Weaver (she/her): And hopefully some insights that inform your practice going forward as library workers and librarians.

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00:00:52.290 --> 00:01:05.880

Kari D. Weaver (she/her): I'd like to take just a moment to acknowledge that I happen to work and am presenting today, from the traditional territory of the neutral Anishinaabe and Haudenosaunee peoples.

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00:01:05.880 --> 00:01:13.399

Kari D. Weaver (she/her): My home and my workplace is situated on the Haldman Tract in what is now Waterloo, Ontario.

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00:01:13.440 --> 00:01:25.629

Kari D. Weaver (she/her): And that was land granted to the Six Nations that includes 6 miles on each side of the Grand River. You can see a visual representation on the slide.

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00:01:25.680 --> 00:01:32.739

Kari D. Weaver (she/her): Of the Haldimand Tract area, and what is now currently the Six Nation Reserve.

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00:01:33.060 --> 00:01:36.770

Kari D. Weaver (she/her): Though I'll be speaking a bit more about

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00:01:36.840 --> 00:01:42.629

Kari D. Weaver (she/her): Artificial intelligence broadly, and its impacts on research.

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00:01:42.650 --> 00:01:58.299

Kari D. Weaver (she/her): Certainly, I don't want to speak about that without also acknowledging that land, water, and data sovereignty are major considerations when we're talking about any kind of artificial intelligence systems.

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00:01:58.300 --> 00:02:12.660

Kari D. Weaver (she/her): And certainly have, profound impacts on Indigenous and generally on more marginalized communities. But there are ways to be more social justice oriented.

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00:02:12.660 --> 00:02:22.890

Kari D. Weaver (she/her): in our pursuit, of new scientific advances and technology. So, on this slide, we can see a contrast between

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Kari D. Weaver (she/her): an Indigenous community that's actually set up their own data center, versus a proposed data center, that was,

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00:02:33.380 --> 00:02:42.569

Kari D. Weaver (she/her): to be set up in northern Alberta without any Indigenous consultation, on... Indigenous lands.

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00:02:43.050 --> 00:03:02.309

Kari D. Weaver (she/her): So I encourage you, though this won't be the main focus of what I'm covering today, as you're thinking about artificial intelligence and how it fits into research and your work more broadly, to consider the fact that the technology, even though it seems

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00:03:02.310 --> 00:03:19.249

Kari D. Weaver (she/her): cloud-based or remote in some fashion, does have profound impacts on communities, and in situated places, that are providing the technology and infrastructure and resources to support

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00:03:19.290 --> 00:03:21.860

Kari D. Weaver (she/her): This work.

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00:03:22.530 --> 00:03:36.389

Kari D. Weaver (she/her): So, today, I'll be going through a number of things, including defining what exactly the research journey is, talking a little bit about where we are with artificial intelligence and research now.

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00:03:36.470 --> 00:03:48.980

Kari D. Weaver (she/her): how we define different types of AI systems used in research, and the uses and level of familiarity of scholars with AI in research workflows.

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00:03:48.980 --> 00:04:01.299

Kari D. Weaver (she/her): After that, we'll be looking closely at two case studies of current researchers and their use of AI, and what that tells us about the direction that the research journey is going.

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00:04:01.440 --> 00:04:10.400

Kari D. Weaver (she/her): We'll discuss some implications for libraries, and finally, at the end, we'll return back to the idea of the research journey.

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00:04:10.400 --> 00:04:23.720

Kari D. Weaver (she/her): And think about what this means in practice for the changing nature of research, as AI becomes increasingly integrated into research workflows.

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00:04:24.680 --> 00:04:33.890

Kari D. Weaver (she/her): So, what exactly is a research journey? Well, a research journey refers to the end-to-end process that a researcher goes through

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00:04:33.890 --> 00:04:48.670

Kari D. Weaver (she/her): to investigate a question and produce new knowledge. And it certainly emphasizes that research is not a single step, but a dynamic and iterative path with multiple stages and decisions and refinements.

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00:04:48.670 --> 00:04:58.289

Kari D. Weaver (she/her): And I think that this is an important concept, and I selected it for today's talk, because Journey really highlights several aspects of research.

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Kari D. Weaver (she/her): first of all, that it's iterative, that it's non-linear, and things can overlap and don't necessarily follow a strict order. That research is highly interpretive, especially in...

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00:05:12.840 --> 00:05:21.260

Kari D. Weaver (she/her): social science and humanities disciplines, and tends to be shaped by judgment, expertise, and context.

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00:05:21.330 --> 00:05:40.319

Kari D. Weaver (she/her): And that it's always evolving, and part of what is evolving currently are tools and methods and our ability to understand the world based on these new AI models and systems. And we're really starting there, because

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00:05:40.710 --> 00:06:02.769

Kari D. Weaver (she/her): what is happening quite broadly with artificial intelligence is that it's taking components of the research journey that used to be completed solely by humans, and it's actually introducing AI to fully replace that human labor, or partially replace that human labor.

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Kari D. Weaver (she/her): But there are still interpretive and iterative stages that highly involve the human researcher.

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00:06:12.390 --> 00:06:13.350

Kari D. Weaver (she/her): So...

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00:06:13.450 --> 00:06:23.389

Kari D. Weaver (she/her): I think another way to consider this is, what are the different kinds of tasks that we complete during a research study?

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00:06:23.400 --> 00:06:36.219

Kari D. Weaver (she/her): And here is a categorization, or a taxonomy, of 18 different steps, some work that I've been working on, with an international group of scholars.

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Kari D. Weaver (she/her): To help consider how artificial intelligence might actually be introduced in different tasks of the research process. So, this most closely aligns with empirical kinds of research studies.

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Kari D. Weaver (she/her): But tasks include idea generation, hypothesis development, literature search, literature summarization.

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00:06:59.130 --> 00:07:12.760

Kari D. Weaver (she/her): Design, study design and experiment design, design data collection methodology, design data analysis plan, data collection, direct operations or activities, data creation.

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00:07:12.760 --> 00:07:24.249

Kari D. Weaver (she/her): Which is something quite new introduced by artificial intelligence. Computer code generation or auditing, data cleaning, preprocessing or auditing.

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00:07:24.360 --> 00:07:30.150

Kari D. Weaver (she/her): Quantitative data analysis, qualitative data analysis, data visualization.

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00:07:30.210 --> 00:07:37.590

Kari D. Weaver (she/her): And then figure or image generation, and these are separated by,

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00:07:37.620 --> 00:07:46.540

Kari D. Weaver (she/her): how much of a data set you're actually working with. Data visualization tends to have a stronger connection to a direct data set.

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00:07:46.540 --> 00:07:58.420

Kari D. Weaver (she/her): Then there's drafting the manuscript or abstract, translation, and editing or rewriting, including tasks related to editing or rewriting reference lists.

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00:07:58.740 --> 00:08:14.470

Kari D. Weaver (she/her): So, we'll return back to this listing when we talk about our cases today, looking at how real researchers are using artificial intelligence within their workflows.

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00:08:15.370 --> 00:08:27.590

Kari D. Weaver (she/her): But thinking about AI and research more broadly, artificial intelligence is being widely used at this point across disciplines, and it's

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00:08:27.800 --> 00:08:46.140

Kari D. Weaver (she/her): primary motivator is to help accelerate and advance scientific discovery when you ask scholars. It's also actually helping to surface new patterns and relationships that previously went unrecognized, even in existing large data sets.

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00:08:46.140 --> 00:08:49.109

Kari D. Weaver (she/her): That had been analyzed by humans.

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00:08:49.110 --> 00:09:03.880

Kari D. Weaver (she/her): But it is actually causing some unintended consequences as well, in that we're seeing a narrowing of focus of what's

getting studied in certain areas that have been analyzed, including natural sciences.

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00:09:03.880 --> 00:09:25.949

Kari D. Weaver (she/her): And there are a lot of concerns, especially with generative artificial intelligence within, research workflows, about transparency, and particularly about reproducibility of research, that heavily relies on AI models.

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00:09:26.200 --> 00:09:38.049

Kari D. Weaver (she/her): So, I do want to go over what do we mean when we're talking about AI, and when I say different types of AI or different types of AI models, what am I referring to?

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Kari D. Weaver (she/her): So...

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00:09:39.490 --> 00:09:59.000

Kari D. Weaver (she/her): AI falls into sort of four main classifiers, and then we'll talk about agentic AI, which is, not exactly its own classification, but kind of an additional layer on top of, a couple of the classifications of AI that we're going to talk about now.

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Kari D. Weaver (she/her): So, when we talk about AI, there first is symbolic logic. This is kind of classic, old-fashioned artificial intelligence.

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Kari D. Weaver (she/her): And this is AI that's based on explicit rules and logical reasoning, where knowledge is represented using symbols and formal logic, and systems solve problems by applying predefined rules. So, if this, then that. Machine learning

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Kari D. Weaver (she/her): is...

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00:10:33.580 --> 00:10:48.120

Kari D. Weaver (she/her): a set of AI systems that learn patterns from data to make predictions or decisions without being explicitly programmed, to come to that logical conclusion. So...

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00:10:48.120 --> 00:11:11.950

Kari D. Weaver (she/her): Machine learning is using a lot of classifiers and regression models and, what are called basic neural networks. And

neural networks are a type of machine learning model that are actually inspired by how the brain works, that are made up of lots of interconnected nodes that enable systemic learning through their interconnections.

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00:11:11.950 --> 00:11:29.319

Kari D. Weaver (she/her): to recognize patterns in data by adjusting weighted connections between layers. And in classic machine learning, those layers for neural networks are typically in the range of about 3 to 10 layers deep.

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00:11:29.730 --> 00:11:44.599

Kari D. Weaver (she/her): Then we have deep learning, which is kind of like what it sounds like. It's deep neural networks. It's a subset of machine learning that uses many multi-layered neural networks, or deep networks.

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00:11:44.600 --> 00:11:56.689

Kari D. Weaver (she/her): Typically with dozens of layers and billions to trillions of parameters to automatically learn complex features from large amounts of data

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00:11:56.690 --> 00:12:14.979

Kari D. Weaver (she/her): enabling advances in areas like image and speech recognition. And we really saw a lot of advancements in deep learning starting around 2012, with advancements in compute technology. And if you think about this.

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00:12:14.980 --> 00:12:26.709

Kari D. Weaver (she/her): That's probably when you started getting, voice notes on your phone, was around that time, and that correlates with the advancement that we're seeing in deep learning.

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00:12:26.780 --> 00:12:50.440

Kari D. Weaver (she/her): And finally, and more recently, we have generative artificial intelligence. So, these are AI systems that actually go beyond learning from existing content and can create new content, such as text, images, audio, video, or code, by learning patterns in the data to inform that creation.

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00:12:50.520 --> 00:13:00.629

Kari D. Weaver (she/her): And it includes large language models and generative models that are used in conversational agents and creative tools as well.

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00:13:01.010 --> 00:13:14.409

Kari D. Weaver (she/her): The reality is that you have been using artificial intelligence when your email program used a spam filter, or when your creditworthiness was assessed by a financial institution for a loan.

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00:13:14.410 --> 00:13:21.029

Kari D. Weaver (she/her): or when you've used an accessible document that has undergone optical character recognition, or OCR,

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00:13:21.030 --> 00:13:37.270

Kari D. Weaver (she/her): And AI as a research field stretches back more than 70 years to those symbolic logic approaches. It didn't just appear in 2022 when generative artificial intelligence became more broadly available.

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00:13:37.270 --> 00:13:44.690

Kari D. Weaver (she/her): However, as large, multi-purpose AI models, which are often called frontier models.

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00:13:44.750 --> 00:13:53.959

Kari D. Weaver (she/her): became more widely available. Their uses grew, and consequently, we're now seeing major changes to research workflows.

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00:13:53.960 --> 00:14:12.089

Kari D. Weaver (she/her): Both with generative artificial intelligence models, but also, in many cases with deep learning models, and keeping both in mind is really important to understanding the ways in which research is actually changing.

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00:14:13.330 --> 00:14:14.300

Kari D. Weaver (she/her): So...

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00:14:14.620 --> 00:14:28.310

Kari D. Weaver (she/her): Layered on top of this, I do want to address for a minute also another term that you might have heard that is important when we look at our case studies, and that is agentic AI. So, what exactly is that?

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00:14:28.310 --> 00:14:40.490

Kari D. Weaver (she/her): Agentic AI is a combination of a large language model and sort of what's called a harness, or an interface, that helps

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00:14:40.580 --> 00:14:58.410

Kari D. Weaver (she/her): LLMs run in a loop, doing more fulsome workflows. So when we look at the chart here, when we're thinking about

the operation of generative AI, or LLMs, the user inputs something, and then

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00:14:58.410 --> 00:15:17.540

Kari D. Weaver (she/her): the user gets an output of something, right? You put in a prompt, you get a response to that prompt. But in an agentic AI system, the LLM is actually running in a loop. So, the user puts in a prompt, and the LLM keeps running.

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00:15:17.540 --> 00:15:23.269

Kari D. Weaver (she/her): Spitting out outputs and feeding it back into the agentic system.

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00:15:23.270 --> 00:15:30.930

Kari D. Weaver (she/her): When it comes to memory, generative AI only has sort of a very limited context window.

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00:15:30.930 --> 00:15:47.129

Kari D. Weaver (she/her): But Agentic systems have that context window that exists for LLMs, and also, memory of what has come before, and what information it holds within that loop.

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00:15:49.560 --> 00:16:00.829

Kari D. Weaver (she/her): Agentic AI also have a lot of built-in capabilities, so they can access files and plugins, do web searches within Agentic.

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00:16:00.910 --> 00:16:16.930

Kari D. Weaver (she/her): systems, whereas with generative AI, you have to actually actively connect, the LLMs to, additional software to have it be

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00:16:17.190 --> 00:16:19.530

Kari D. Weaver (she/her): Particularly useful.

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00:16:19.710 --> 00:16:37.119

Kari D. Weaver (she/her): So, the scope is quite different. When we're talking about agentic, we're talking about a fairly full start-to-finish workflow, whereas with generative AI, we're talking about single, discrete conversations, or a series of conversations.

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00:16:37.150 --> 00:16:50.710

Kari D. Weaver (she/her): That are prompted by the initial user. So, you're probably most familiar with generative AI or LLMs. These are things like ChatGPT, Claude, Gemini, Microsoft Copilot.

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00:16:50.710 --> 00:16:57.929

Kari D. Weaver (she/her): Agentic systems are often put out by the same companies behind those generative,

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00:16:58.020 --> 00:17:10.380

Kari D. Weaver (she/her): AI LLMs, but those are things like ChatGPT Codex, Claude Code, Claude Co-Work, and OpenClaw that you might have heard about in the news.

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00:17:12.030 --> 00:17:14.469

Kari D. Weaver (she/her): So, moving forward..

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00:17:14.800 --> 00:17:25.890

Kari D. Weaver (she/her): I did want to share this. This is coming out of, actually, a group that does, research funded by Microsoft. But when we think about,

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00:17:26.030 --> 00:17:36.809

Kari D. Weaver (she/her): different ways, not just throughout the process, but kind of holistically, that AI might be used in academic research.

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00:17:37.120 --> 00:17:51.460

Kari D. Weaver (she/her): in some study, they've looked at and said there are sort of 5 large grouping categories. There's AI for scientific comprehension, AI for academic survey.

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00:17:51.460 --> 00:17:59.400

Kari D. Weaver (she/her): AI for scientific discovery, AI for Academic Writing, and AI for Academic Peer Reviewing.

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Kari D. Weaver (she/her): And these are all possible uses of artificial intelligence, or possible categorizations or classifications of artificial intelligence within research workflows, though a little less discrete, than the classification of different research tasks that we looked at.

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00:18:20.490 --> 00:18:26.120

Kari D. Weaver (she/her): And I think, considering, sort of, what task,

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00:18:26.290 --> 00:18:38.769

Kari D. Weaver (she/her): what tasks fall within these different groupings might be helpful to sort of thinking about where we fit, when it comes to libraries.

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00:18:39.190 --> 00:18:51.200

Kari D. Weaver (she/her): So, finally, before we get into our case studies, I wanted to just look at some of the most current research that we have on how familiar researchers are with AI.

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00:18:51.200 --> 00:19:06.519

Kari D. Weaver (she/her): So this is a chart that comes out of a study of a couple of large research institutions in Germany, which is the most up-to-date and well, conducted research that we currently have.

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Kari D. Weaver (she/her): On how, how...

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00:19:09.110 --> 00:19:19.400

Kari D. Weaver (she/her): folks are, are responding, as researchers to the introduction of AI tools within research workflows.

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00:19:19.650 --> 00:19:27.470

Kari D. Weaver (she/her): And we can see that, through this that...

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00:19:27.660 --> 00:19:38.320

Kari D. Weaver (she/her): Characteristics of the individual, including their area of study, their gender, their age, and their level of education and work experience.

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00:19:38.340 --> 00:19:55.270

Kari D. Weaver (she/her): certainly impact, their familiarity and use of artificial intelligence tools within research workflows. And I wanted to show this because I think we'll see some of the same things that we see here.

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00:19:55.270 --> 00:20:03.349

Kari D. Weaver (she/her): Actually play out, when we move to looking at the case studies in just a moment.

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00:20:04.750 --> 00:20:19.270

Kari D. Weaver (she/her): So, now I'd like to introduce you to two case studies with two different, researchers, and talk a little bit about how they are using artificial intelligence in their research.

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00:20:19.480 --> 00:20:36.570

Kari D. Weaver (she/her): workflows. Both of these researchers, though the names have been changed, are real people, who have been gracious enough to share with me, what their integration of artificial intelligence into their research work looks like.

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00:20:36.930 --> 00:20:51.170

Kari D. Weaver (she/her): So, first we have Laurel. Laurel is a theoretical physicist, and though originally from a Francophone country in Africa, is now working at an English-speaking research university in Canada.

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Kari D. Weaver (she/her): Laurel is a relatively new faculty member, having just recently started second year beyond her postdoc, and though she is on the tenure track, she is not yet tenured in her work.

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Kari D. Weaver (she/her): And has only recently begun, supervising graduate students as well, and is just getting close to finishing, setting up her research lab.

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Kari D. Weaver (she/her): So, Laurel, when we return back to that list of the 18 research tasks, is using artificial intelligence in several ways throughout the research process.

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Kari D. Weaver (she/her): She's using it to help supplement and, in many instances, fully conduct her literature search.

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00:21:42.520 --> 00:21:53.670

Kari D. Weaver (she/her): She's using it to help with experimental design in her area of study, and also to design data collection methodologies.

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00:21:53.740 --> 00:22:08.180

Kari D. Weaver (she/her): In particular, she makes very heavy use of artificial intelligence for computer code generation, and in fact, no longer starts, despite expertise in coding.

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00:22:08.440 --> 00:22:19.340

Kari D. Weaver (she/her): To code independently, and always depends on artificial intelligence for, coding support and generation.

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00:22:20.830 --> 00:22:35.979

Kari D. Weaver (she/her): Also, she uses it for data cleaning and pre-processing, and most of her research is quantitative in nature, so she certainly relies on artificial intelligence, particularly that coding aspect.

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00:22:35.980 --> 00:22:41.589

Kari D. Weaver (she/her): To write custom code for quantitative data analysis.

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00:22:41.650 --> 00:23:06.290

Kari D. Weaver (she/her): She also has, at points, used it for data visualization or figure or image generation. Both are quite important in her field, and it can be difficult and very time-consuming for theoretical physicists to come up with quality visualizations or figures, given the nature of the area of study.

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00:23:06.330 --> 00:23:10.750

Kari D. Weaver (she/her): But it's also incredibly important for scientific communication.

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Kari D. Weaver (she/her): Also, because Laurel is not originally an English-speaking individual, and is conducting her research and publishing in English now.

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00:23:25.730 --> 00:23:33.059

Kari D. Weaver (she/her): She does rely on it at times for translation support in her work.

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00:23:33.120 --> 00:23:46.040

Kari D. Weaver (she/her): And certainly for editing or rewriting, including reference lists, which she finds tiring and quite cumbersome, and is very happy to outsource to artificial intelligence.

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00:23:47.160 --> 00:23:54.990

Kari D. Weaver (she/her): So, what kinds of tools is Laurel using throughout her process? Well, she's relying on,

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Kari D. Weaver (she/her): series of different and discrete AI tools. She's using Perplexity, for discovery and mapping of sources in that literature search. She's using the free version of ChatGPT for coding, and then because she already has expertise in this area, she's doing a lot of cleanup by hand.

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00:24:17.270 --> 00:24:36.730

Kari D. Weaver (she/her): she is relying on Dolly and ChatGPT for image generation, and her institutionally provided license for Copilot, which she's not particularly happy with, to support data analysis for any data that she thinks might potentially have sensitive information.

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00:24:36.780 --> 00:24:53.679

Kari D. Weaver (she/her): And then she's going back to the free version of ChatGPT for translation and editing support, and she's really quite unconcerned with her material being used for training data, and this isn't a big issue.

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00:24:53.680 --> 00:24:59.089

Kari D. Weaver (she/her): For the other tasks which she uses, AI for.

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00:24:59.090 --> 00:25:16.949

Kari D. Weaver (she/her): at sort of less frequent levels, she's often going to and relying upon and happy with ChatGPT for those purposes. And that's the tool outside of perplexity that she feels most happy and comfortable with.

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00:25:19.410 --> 00:25:30.090

Kari D. Weaver (she/her): While she does occasionally try other AI tools, she does keep coming back to ChatGPT, because she finds the interface really easy to work with.

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00:25:30.090 --> 00:25:40.509

Kari D. Weaver (she/her): And simple to use. And she's really relying on it primarily to close her own knowledge gaps, or to help accelerate her research process.

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00:25:40.510 --> 00:25:48.829

Kari D. Weaver (she/her): Which she estimates to be a time savings of maybe about 15-20% of her time in the research process.

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00:25:49.940 --> 00:25:52.630

Kari D. Weaver (she/her): So now I'd like to talk about David.

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Kari D. Weaver (she/her): David is a business management professor. He's a mid-career researcher, already with tenure, and works at an English language university in Southeast Asia. David is a heavy user of artificial intelligence in his research process.

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00:26:12.040 --> 00:26:36.099

Kari D. Weaver (she/her): And though he wouldn't necessarily describe his research process as being agentic, he relies heavily on agentic tools, as we'll see in just a moment. So, David actually uses artificial intelligence in one way or another in all of the 18 research tasks that we looked at earlier.

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00:26:37.700 --> 00:26:42.179

Kari D. Weaver (she/her): So, he's relying specifically heavily on Claude Cowork.

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Kari D. Weaver (she/her): Which is a subscription covered by grant funds that he has available as a known mid-career researcher, and a ChatGPT Codex subscription that is provided to him through an institutional license. He's using Claude Co-work for a wide variety of tasks, particularly to access local files that he

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00:27:06.990 --> 00:27:11.600

Kari D. Weaver (she/her): Pulls together on concepts or some interesting notes or ideas.

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00:27:11.600 --> 00:27:23.409

Kari D. Weaver (she/her): To generate hypotheses, complete ethics applications for human subjects research, design data collection instruments, collect data, depending on the kind of study.

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00:27:23.410 --> 00:27:40.900

Kari D. Weaver (she/her): clean and anonymize transcripts, where it can't do direct data collection. With ChatGPT codecs, he's built code for statistical analysis, and then run the analysis, typically in Python, but sometimes in other coding languages.

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00:27:40.900 --> 00:27:51.519

Kari D. Weaver (she/her): Sometimes because he's based in Southeast Asia, he's working with non-English language research data and relies on

136

00:27:51.520 --> 00:27:57.370

Kari D. Weaver (she/her): Claude Co-work for direct translation of those research data.

137

00:27:57.370 --> 00:28:21.179

Kari D. Weaver (she/her): Also, literature reviews, summaries, some manuscript writing, and all reference formatting have been outsourced to primarily Claude Co-work, sometimes with a little bit of interaction back and forth between Claude Cowork and ChatGPT Codex to actually have the two systems check work from one another.

138

00:28:21.370 --> 00:28:38.769

Kari D. Weaver (she/her): And he also depends quite heavily on plugins from Claude Co-Work from Microsoft applications, particularly Word, Excel, and PowerPoint, to help enhance and streamline dissemination of his research work.

139

00:28:41.680 --> 00:28:48.710

Kari D. Weaver (she/her): This is a direct quote from David. Ai is my best research assistant.

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00:28:48.710 --> 00:29:12.720

Kari D. Weaver (she/her): Though he doesn't describe this as a fully automatic or agentic workflow, he uses Cowork heavily enough that he usually runs out of tokens on days he's working on research. And Claude Cowork has a limit of a number of tokens and about a 5-hour limit of usage time on a daily basis.

141

00:29:12.920 --> 00:29:24.430

Kari D. Weaver (she/her): But he does find and currently does implement validation steps, and often finds that he has to step in at different points in the process.

142

00:29:24.430 --> 00:29:39.099

Kari D. Weaver (she/her): To refine what Claude Co-Work is giving him. So, it'll be mostly correct or close, and his intervention or refinement can get it all the way to what he is looking for.

143

00:29:40.690 --> 00:29:46.380

Kari D. Weaver (she/her): So, Laurel's process when she's implementing artificial intelligence

144

00:29:46.390 --> 00:30:02.329

Kari D. Weaver (she/her): She wants to increase her speed, but she wants to balance that with growth, and she's primarily concerned with her continued growth and skill development as a fairly early career researcher working toward tenure.

145

00:30:02.440 --> 00:30:04.110

Kari D. Weaver (she/her): David.

146

00:30:04.410 --> 00:30:21.850

Kari D. Weaver (she/her): Already has tenure and wants to leverage the flexibility and speed of artificial intelligence, but he is very much

concerned with maintaining quality and the integrity of his research, despite his heavy use of artificial intelligence.

147

00:30:24.010 --> 00:30:42.840

Kari D. Weaver (she/her): What's actually happening right now is that the majority of researchers that you probably interact with look a lot like Laurel, and reflect Laurel's AI use and process, but as models become more broadly available,

148

00:30:43.010 --> 00:30:44.560

Kari D. Weaver (she/her): more cheaply.

149

00:30:44.910 --> 00:30:49.249

Kari D. Weaver (she/her): We're actually seeing circumstances where

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00:30:50.170 --> 00:31:05.350

Kari D. Weaver (she/her): researchers are going to look more like David's use of artificial intelligence, in the research workflow. So, over time, we're going to move from Laurel, where we are right now.

151

00:31:05.350 --> 00:31:09.179

Kari D. Weaver (she/her): to David, and, of course.

152

00:31:09.180 --> 00:31:29.580

Kari D. Weaver (she/her): in libraries, we have to be prepared to respond to that. So, where exactly do libraries belong in a world of AI-driven research? Do we act solely as repositories of knowledge or data, with all research functions carried out by artificial intelligence and the researcher?

153

00:31:29.580 --> 00:31:38.769

Kari D. Weaver (she/her): Or do libraries and library workers enable the research processes alongside artificial intelligence and the researcher?

154

00:31:42.090 --> 00:31:57.609

Kari D. Weaver (she/her): And I like to think of these two possible futures as the warehouse versus the workshop model, where it comes to the potential positioning of libraries in the future of research workflows.

155

00:31:58.040 --> 00:31:59.010

Kari D. Weaver (she/her): So...

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00:31:59.150 --> 00:32:18.580

Kari D. Weaver (she/her): What is the warehouse model? Well, in the warehouse model, we focus on our unique collections. We have to focus on how we understand, or focus on understanding how to make licensed content available, ready, and connected to AI-enabled research workflows.

157

00:32:18.580 --> 00:32:36.809

Kari D. Weaver (she/her): We have an opportunity to emphasize our existing expertise in data, metadata creation, generation, structured data, large data sets, harnessing open data, and we will need to develop expertise to connect library data systems

158

00:32:36.850 --> 00:32:47.670

Kari D. Weaver (she/her): With researchers' AI tools, and that will be a primary direction that we need to move, and ensure we are enabled to support.

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00:32:48.160 --> 00:33:00.480

Kari D. Weaver (she/her): If we're looking more at the workshop model, we're not necessarily eskewing, the... the other option. But...

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00:33:00.980 --> 00:33:10.480

Kari D. Weaver (she/her): we have to become familiar with using and creating AI agents and those agentic-type research workflows.

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00:33:11.490 --> 00:33:21.309

Kari D. Weaver (she/her): we're moving more toward training researchers to use different AI systems, and perhaps connect different AI systems.

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00:33:21.310 --> 00:33:32.049

Kari D. Weaver (she/her): We possess specific expertise in evaluation and validation of information, and we need to actually figure out how to translate that.

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00:33:32.050 --> 00:33:46.930

Kari D. Weaver (she/her): to AI-enabled research workflows in meaningful ways for scholars. And we probably have a role in helping to bridge what is a new digital divide,

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00:33:47.310 --> 00:33:52.539

Kari D. Weaver (she/her): In Laurel's case, she wasn't using a lot of,

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00:33:52.960 --> 00:34:05.890

Kari D. Weaver (she/her): subscription AI services, because she didn't have grant funds or great availability from her institution for highly powered agentic models.

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00:34:05.890 --> 00:34:14.040

Kari D. Weaver (she/her): or workflows that would be available to her. But libraries may have a role in helping address this.

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00:34:14.070 --> 00:34:24.050

Kari D. Weaver (she/her): The rise in artificial intelligence technology and the increasing use is also driving up costs of computer hardware.

168

00:34:24.110 --> 00:34:47.720

Kari D. Weaver (she/her): And costs for computer memory and processing. And all of those things may create a situation where libraries continue to be a place for individuals to get access to not just AI models, but also hardware, that individuals need to be able to interact

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00:34:47.719 --> 00:34:50.140

Kari D. Weaver (she/her): with artificial intelligence.

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00:34:50.139 --> 00:34:51.840

Kari D. Weaver (she/her): In their work.

171

00:34:52.679 --> 00:35:09.430

Kari D. Weaver (she/her): So, that brings us back to the conclusion, the future of the research journey. So, for scholars, they're going to continue to rely on free tools because of budget constraints.

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00:35:09.430 --> 00:35:15.060

Kari D. Weaver (she/her): That they're under, but those free tools are going to get better over time.

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00:35:15.060 --> 00:35:30.289

Kari D. Weaver (she/her): And we can expect, probably within the next 6 months to a year, the free tools that would be available to Laurel look a lot more like the paid tools that David is currently using.

174

00:35:31.880 --> 00:35:56.559

Kari D. Weaver (she/her): we might see a larger number, or I think we should expect to see a larger number of researchers leveraging one or two expensive tools where costs are covered by grants, institutions, or perhaps libraries. And this is going to require researchers to level up their AI skills and knowledge, both how to use it and what makes sense within the

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00:35:56.560 --> 00:36:01.779

Kari D. Weaver (she/her): context of their work and their own positioning and development.

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00:36:01.780 --> 00:36:07.989

Kari D. Weaver (she/her): Certainly, there is an ongoing need for better validation processes and checks.

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00:36:08.050 --> 00:36:18.360

Kari D. Weaver (she/her): And as more elements of the research journey are completed by AI, the research journey itself is going to appear shorter.

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00:36:18.360 --> 00:36:30.830

Kari D. Weaver (she/her): But in reality, the journey is just going to be as iterative and convoluted as it was before. It's just that's not necessarily as present to the people engaging in the research.

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00:36:30.830 --> 00:36:32.980

Kari D. Weaver (she/her): And finally,

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00:36:32.980 --> 00:36:54.630

Kari D. Weaver (she/her): even though I've presented two case studies of individual researchers today, the reality is that a lot of research is actually done in small groups or even large laboratories or teams. And there's certainly movement toward agentic team workspaces and workflows.

181

00:36:54.630 --> 00:37:19.189

Kari D. Weaver (she/her): Where individuals within a lab environment could share all of their files, all of their ideas, and connect all of that. And I think there's certainly a question for libraries about how we fit into those spaces that are not necessarily new, but are introduced by the work happening in a slightly different research environment.

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00:37:19.970 --> 00:37:20.910

Kari D. Weaver (she/her): So...

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00:37:21.390 --> 00:37:28.950

Kari D. Weaver (she/her): with all of that, I'd like to leave you with the final question today of those two models.

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00:37:29.050 --> 00:37:33.969

Kari D. Weaver (she/her): That we talked about just a minute ago.

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00:37:34.090 --> 00:37:37.809

Kari D. Weaver (she/her): The warehouse or the workshop.

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00:37:38.070 --> 00:37:50.420

Kari D. Weaver (she/her): which one is really the direction that we need to go in libraries, and especially in our fiscal austerity-based environment within the province of Ontario?

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00:37:50.710 --> 00:38:01.699

Kari D. Weaver (she/her): Which direction is going to position libraries best to continue to sit at the nexus of learning and research as we move into the future?

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00:38:02.100 --> 00:38:20.720

Kari D. Weaver (she/her): So with that, I'd like to thank you so much, for joining me today. I have a few references, and the slides will be shared. Because I'm not able to be with you live in person, if you do have questions or comments, or you'd like to talk about any of this in greater detail.

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00:38:20.720 --> 00:38:24.150

Kari D. Weaver (she/her): I'm always available via email.

190

00:38:24.150 --> 00:38:43.560

Kari D. Weaver (she/her): My email is carri.weaver at oakle.on.ca, and thank you so much to Emily for inviting me. Again, I'm sorry I couldn't be there in person, but you have an excellent program, and I hope that you enjoy the rest of your day.

191

00:38:43.560 --> 00:38:54.390

Kari D. Weaver (she/her): And... Learn quite a bit, about how artificial intelligence fits into the future of library work.

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00:38:54.750 --> 00:38:56.549

Kari D. Weaver (she/her): Thank you so much.