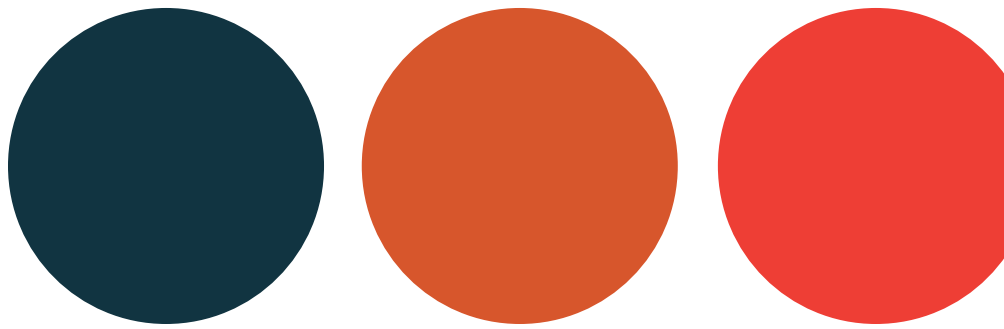


Future of Work and Disability

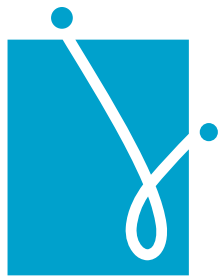


**Inclusion, artificial intelligence,
machine learning and work**

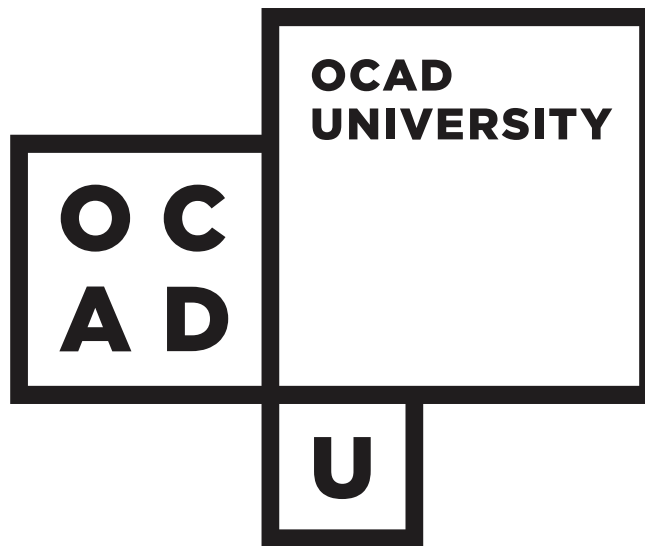
A Report to Accessibility Standards Canada / May 1, 2021



Future of Work
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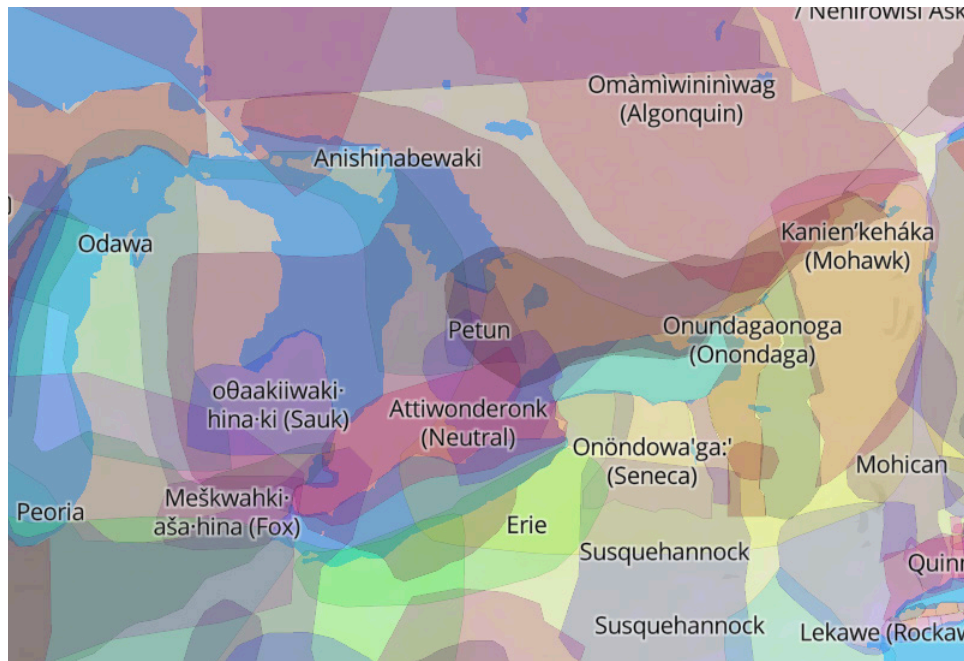


inclusive design
research centre



The land on which we stand and create

OCAD University acknowledges the ancestral and traditional territories of the Mississaugas of the Credit, the Haudenosaunee, the Anishinaabe and the Huron-Wendat, who are the original owners and custodians of the land on which we stand and create.



This picture is a snapshot from the website Native Land (<https://native-land.ca/>), a community-generated mapping of Indigenous Nations around the world.

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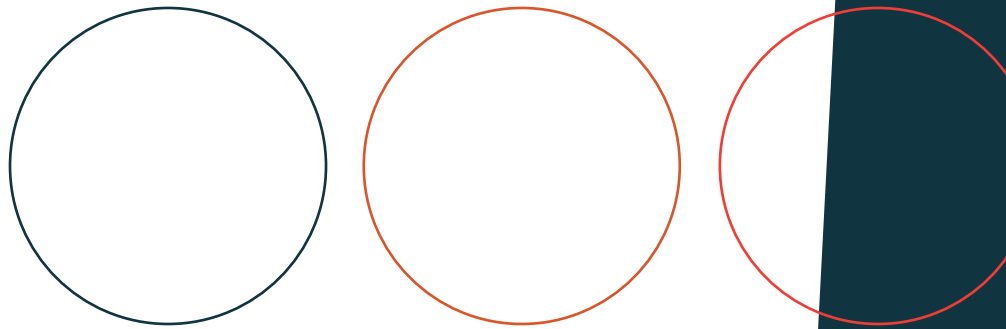
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Introduction

The Future of Work and Disability Project of the Inclusive Design Research Centre (IDRC) examined the barriers and opportunities that artificial intelligence (AI) and other “smart” technologies present for persons with disabilities (PWD) in the sphere of employment.



About the project

The Future of Work and Disability Project of the Inclusive Design Research Centre (IDRC) examined the barriers and opportunities that artificial intelligence (AI) and other “smart” technologies present for persons with disabilities (PWD) in the sphere of employment.



Figure 1: Sphere of employment

Objectives of The Future of Work and Disability include:

- Explore, understand, and draw insights into how artificial intelligence and other smart technologies affect persons with disabilities and limit or improve their opportunities and well-being with regards to employment.
- Produce a report that will share the insights gained through the workshop activities.

Disability models and language

In this document, we use a person first approach when referring to people with disabilities but recognize that individuals may have other preferences for how they identify as having a disability.

We also recognize that there are two dominant disability models:

- The medical model, which tends to view disabilities as characteristics of individuals rooted in diagnostic, therapeutic or rehabilitative viewpoints. This model often aims to correct or fix the individual disabled person, or carve out accommodations for them from the mainstream.
- The social model, which tends to view disability as a mismatch between an individual's needs and the environment and society they live. This model usually aims to redesign the environment and society to be inclusive, to allow people to live life with dignity, autonomy and independence.

In this report, we follow the goals and values of the social model, while also recognizing the prevalence in many areas (including legislation and regulations) of the medical model.

About

...the Inclusive Design Research Centre

The Inclusive Design Research Centre at OCAD University is an international community of open-source developers, designers, researchers, educators, and co-designers who work together to proactively ensure that emerging technology and practices are designed inclusively. The IDRC leads and partners in collaborative, multi-sector, applied research networks that proactively prevent barriers and promote greater inclusion.



...the funder

This research was funded by Accessibility Standards Canada. Accessibility Standards Canada creates accessibility standards that will apply to the federal government and federally regulated organizations, and funds research that aims to identify, prevent, and eliminate accessibility barriers to create future accessibility standards.

...the expert collaborators

Our expert collaborators many of whom identify as having a disability formed a study group that was comprised of fourteen individuals, many with lived experiences of disability and/or knowledge of the AI field. The group was selected through a call for participation from the IDRC, and a selection process was used to ensure that there were diverse perspectives within the group for learning, collaborating and creation of this document. Throughout the writing of this report, the study group has been actively engaged in revising and contributing to its content.

...the participatory approach

Like the entire world, our project was impacted by the COVID-19 pandemic and the changes required in all areas of life under quarantine. What was originally envisioned as a few days of intensive in-person study and collaboration, became an eight-session remote study group spanning six months using a combination of synchronous and asynchronous technologies to learn, reflect and collaborate on the following future of work topics:

- ① Risks and opportunities of artificial intelligence for persons with disabilities with regards to employment
- ② Identifying and Addressing Bias in Machine Learning Models from a Policy Perspective
- ③ Making Artificial Intelligence Inclusive for Hiring and HR



Exploration of each topic included one week of guest presentations, with an open question-and-answer period that was open to the public as an online seminar, followed a week later by a guided co-design activity on the same topic for the study group. The study group participated in reflection activities and discussions throughout the project that allowed them to share their personal experiences as they related to the topics. This approach allowed for learning and framing of the topic as well as opportunity to explore themes of interest to the group in more detail.

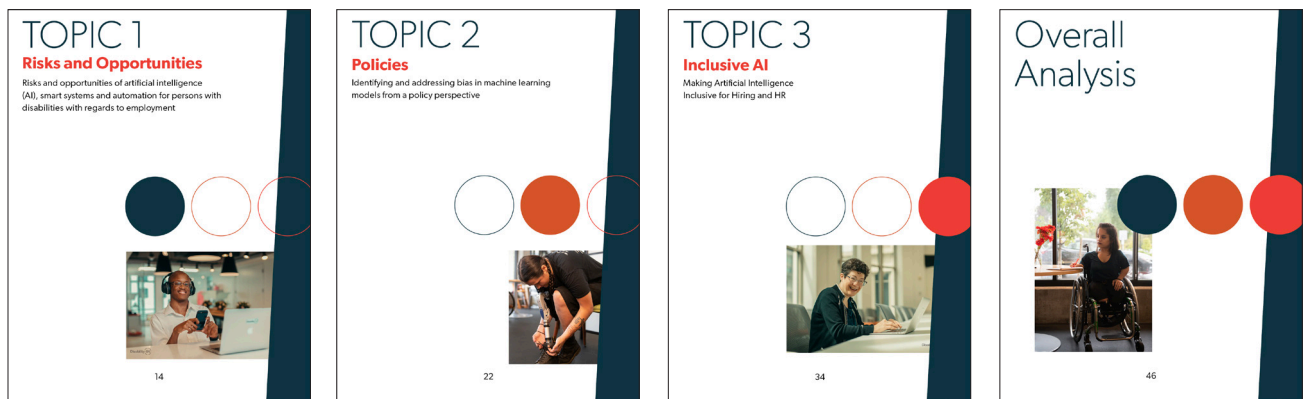
The program of study was designed to bring together various members of the disability, employment, and AI communities, both locally and internationally, to think through the urgent social, ethical, and legal issues at stake. This document takes insights gained from the presentations and their corresponding activities and offers a roadmap of things to consider as AI becomes more integrated into all aspects of the employment cycle. Persons with disabilities are particularly susceptible to bias, exclusion, and harm resulting from the use of these technologies, and this paper underscores areas of potential concern as well as areas where AI could create new opportunities. In many ways, this document is best described as cautionary, since it seeks to identify areas of current and potential harm, and as aspirational, since it envisions scenarios of opportunity where AI could help improve the world as we know it. We hope this report contributes to the growing literature on the social and ethical impacts of AI.

...the report

This report represents the work of the study group over the span of 6 weeks of concentrated study and then several months of collaboration. The report runs parallel with the order of the weekly topics undertaken by the study group: Section 1 of the report covers content from weeks 1 and 2, section 2 covers content from weeks 3 and 4, and the final section, section 3, covers content from weeks 5 and 6. We divide the



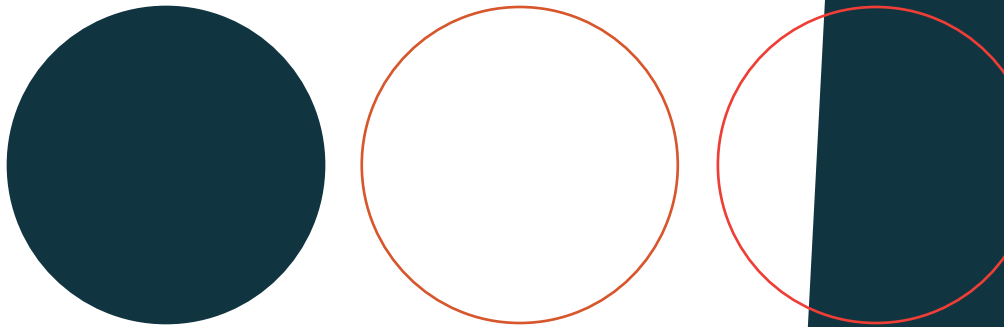
sections between What We Learned and What We Created to align with the different formats of panel discussions and co-design activities, and a concluding What it Means to summarize the most important understandings generated by the group. The report concludes with an overall analysis of the risks and opportunities, and recommendations for moving the work forward.



TOPIC 1

Risks and Opportunities

Risks and opportunities of artificial intelligence (AI), smart systems and automation for persons with disabilities with regards to employment



What we learned

In the first two weeks, we looked at the different ways that artificial intelligence, smart systems, and automation are having and will continue to have an impact on persons with disabilities (PWD) in the area of employment. More specifically, we spent a great deal of time thinking through the possible risks and opportunities that these tools bring with them. To help us understand these risks and opportunities, we had presentations from a number of experts in the field, including Dr. Anhong Guo, Dr. Shari Trewin, Ben Tamblyn, and Chancey Fleet.

We learned that AI systems have the potential to amplify existing stereotypes, and that there is still much work to be done in addressing these problems. For instance, a self-driving car may not respond appropriately to avoid a collision with person who propels their wheelchair backwards and a chat bot may not be able to recognize the speech patterns of someone with dysarthric speech or other speech differences. We further learned that the underlying techniques or practices that power AI systems can also be biased — by treating disability data as outlier and also by using training data that does not reflect the complexity of the real world of human difference. There are also important questions to consider when collecting data from scratch about PWD — questions about how

Dr. Anhong Guo is an Assistant Professor in Computer Science and Engineering at the University of Michigan, and a lot of his work has been dedicated to issues of fairness in AI for PWD.

Dr. Shari Trewin is the Accessibility Manager and Research Lead at IBM, and her work is also on issues of fairness in AI for PWD.

Ben Tamblyn is the Director of Storytelling and Corporate Communications at Microsoft, where he crafts stories about Microsoft and the human impact of technology.

Chancey Fleet is the Assistive Technology Coordinator at the New York Public Library. She is a community catalyst, organizer, and is also blind.

to encourage participation, given that the issue of consent is extremely important when the data is tied to information about disability that individuals may consider sensitive. The related concerns about the privacy and sensitivity of this personal data, and the coverage and quality of data, are also issues that require further attention.

AI also has the potential to make the workplace more inclusive by making workplace accommodations faster and more convenient. For example, AI based captions can support “ad hoc” workplace interactions and object recognition can support individuals unable to view an image or see and travel through “live spaces.” AI is already part of hiring processes. The motivation is not only efficiency but to help mitigate human bias, given that people routinely underestimate the abilities of PWD. However, the fairness of AI methods needs to be examined since human bias can be amplified rather than mitigated by machine learning. There is an important paper on this topic called: *Recruitment AI has a disability problem*. At companies like IBM, the approach to AI ethics is to treat AI as something that augments but does not replace human intelligence. This seems to be one way of mitigating the potential consequences of placing too much emphasis on AI. When AI is part of decision-making, it is important that the decisions made by AI are explainable. A “black box” problem occurs when we don’t understand how AI decision are made. IBM has created an open-source toolkit called *AI explainability 360* which can help developers provide explanations for AI decisions. This kind of kit is important because it provides tools and guidance for developers to create systems that allow individuals opportunity to challenge, question, and test the model. There is also an *AI fairness 360 toolkit* at IBM for identifying different ways of measuring fairness.

Some further issues were raised on the negative consequences of proctoring software in the employment context. People with blindness, who are neurodivergent or who have non-normative facial features,



may be screened as inattentive because AI privileges normative eye contact. Individuals who have personal support workers may be flagged for behaviour that is considered suspicious during the hiring process.

To address these false determinations, it is important that:

- Disability communities be consulted, centred, and included as new AI tools are developed.
- More PWD join the developer pipeline.
- Products and systems are designed with inclusion and accessibility from the beginning rather than at the end.
- Designers have an inclusion and accessibility mindset.
- Advocacy groups and policy makers hold those who say they have considered accessibility in their designs accountable.

Another important point raised by our AI and inclusion experts, was that creating an inclusive workplace is not just about bringing in diverse talent. The biggest barrier to inclusion in the workplace is attitudinal and stems from problems in workplace culture. These attitudinal barriers are a recurring theme throughout this report.

What we created

In our online discussion forum, our study group documented their thoughts on potential barriers and opportunities generated by AI and smart technologies for employment:

AI in Job Seeking and Recruitment

- There is tension between the potential neutrality of AI-powered hiring (vs human bias against persons with disabilities) and the benefit of in-person contact for networking purposes.
- AI that supports creation of accessible postings on recruiting sites could be a beneficial use of AI technology by removing accessibility barriers.



- There is opportunity for AI to support creation of plain-language employment contracts or regulations such as the Employment Standards Act to help employees understand their rights.
- There is opportunity to better support the accessibility application process using smart technologies. For example, by supporting completion of forms especially for users of assistive technology like screen readers.
- Systems that scan resumes are not able to recognize that PWD have unique job skills that are transferrable, which leads to job rejections.

AI and Attitudinal Barriers

Another theme that came from the discussion forum is that attitudinal barriers continue to be the greatest barrier to employment for people with disabilities.

One suggestion to help respond to this barrier is to use AI data tools to gather experience data from employers who have hired and then using this data set to help educate potential employers with limited experience with PWDs. Data about people with disabilities is lacking and this data could contribute to the stock of knowledge about PWD.

The most important thing is that the broader community needs to be educated as to what disabled people are capable of doing [and] where strengths lie so that [others] can see a benefit in hiring people with disabilities.

—Kevin Keane

What it means

Analysis of the first two weeks of the study group materials indicates that barrier and opportunities of AI and machine learning are not easily decoupled from other aspects of employment; the technology itself is not always what causes barriers/problems. Attitudes that devalue the



abilities of people with disabilities, lack of representation in the data ecosystem and failure to design policies and systems inclusively all contribute to barriers to an in employment for people with disabilities.

Many PWD have unconventional job histories and AI is likely not able to recognize this experience when scanning resumes. To help address this concern, it would be beneficial if online job sites had a section specifically for PWD.

Our stakeholders felt that diverse experiences that may deviate from standard experiences found on CVs are not treated with equal value, and in many cases, are completely overlooked and ignored. What is often more important for employers to recognize is that PWD must find unusual but effective ways to complete daily tasks that most people take for granted, like getting out of bed. Janet Rodriguez, another stakeholder, explains that “PWD bring the same resourcefulness to the work environment, and this cannot always be measured with an AI software.”

Barriers rooted in societal beliefs, attitudes, and biases about disability must be addressed and considered in employment systems policy, development, and implementation. This problem is in no way created by technology but can be exacerbated by technology. We must acknowledge this deep-rooted discrimination that and how it is intertwined with technology. There are several problems related to AI and employment including:

Lack of understanding of the AI systems by employers, employees, and potential employees. The “black box” problem must be addressed so that decision-making parameters are well-understood and testable. Transparency about use of these systems is also important such that individuals can understand the processes that may impact them.

Training of AI systems using data that does not represent PWD and other minority groups. AI systems cannot be developed based on “majority rules” data approaches. General principles about PWD and general data sets within AI will be inadequate in addressing issues of exclusion. Employment systems must be developed with a more equitable and diverse approach to understanding data.

Failure to understand and value the experiences of PWD. Attitudinal barriers must be addressed, and systems must be testable for bias against individuals who have features and experience that do not fit into the perceived average.

Failure to encourage and support entry of PWD in AI fields. Diverse participation is the best way to build systems that reflect diversity. There must be an expectation of diversity in education, training, and employment of individuals in related AI and data science fields. Involvement of PWD in the creation of AI tools, rather than thinking about accessibility and inclusion after the fact, is one of the best ways to address this problem: “accessibility by design”.

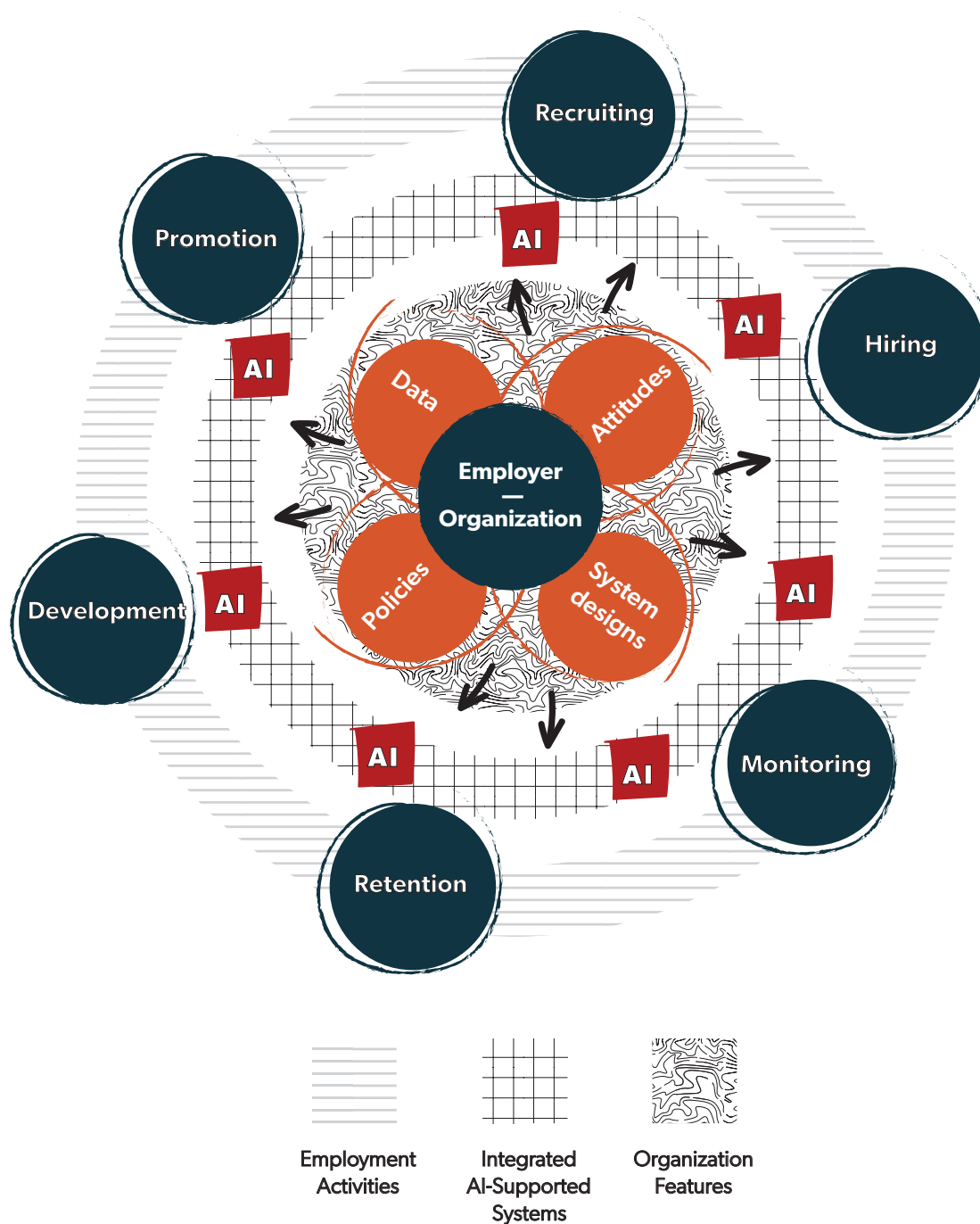
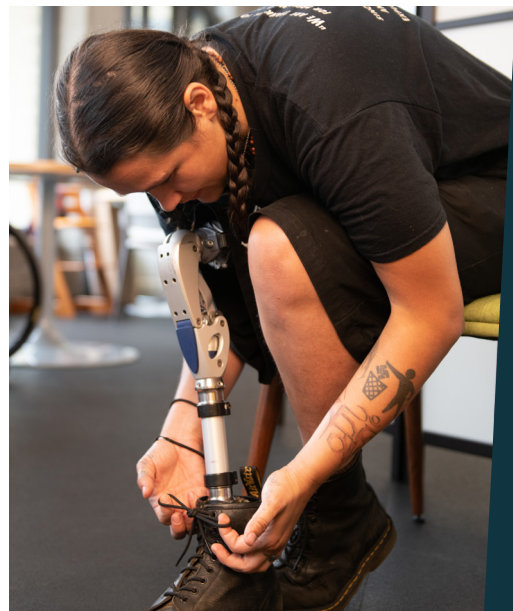
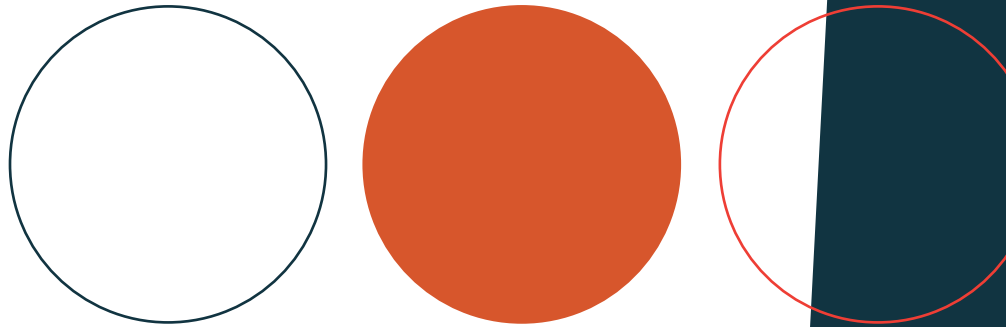


Figure 2: Employer data, attitudes, policies and system designs as well as the AI systems that support employment activities can further exacerbate bias against PWD both in employment and in the AI-driven systems that support them.

TOPIC 2

Policies

Identifying and addressing bias in machine learning models from a policy perspective



What we learned

We began our learning on policy by attending a panelist discussion featuring Alexandra Reeve Givens and Dr. Julia Stoyanovich.

Alexandra Reeve Givens began by offering some **examples of technologies applied to hiring and common issues** with them:

- Resume screening tools designed to sort and filter large pools of applicants. These tools are frequently trained to look for traits of “successful” employees in an existing employee pool, which perpetuates existing patterns of inequality.

- Tests used in hiring tools may purport to test one thing but be designed in a way that impacts candidates with disabilities. Her example was a test where candidates were told to click on the side of an image with a larger proportion of yellow dots, a measure of speed and accuracy, but also a design that excludes candidates with a range of disabilities such as colorblindness and mobility impairment.

Reeve Givens then provided an overview of the **legal frameworks in the United States around hiring technology**. The federal Americans with Disabilities Act (ADA) has language that raises concerns about the legality of some tests and their potential discriminatory effects. In particular:

- Testing must be accessible, and candidates must be able to be request reasonable accommodation.
- A prohibition on employment tests that screen out or tend to screen out people with disabilities.

Alexandra Reeve Gaivens is the CEO of the Center for Democracy and Technology, a think tank focused on protecting democracy, individual rights, and digital age policy.

Dr. Julia Stoyanovich is an Assistant Professor at New York University and the founding director of NYU’s Center for Responsible AI.

- Liability if employers fail to select and administer tests in a way that ensures the tests accurately reflect the skills they purport to measure, rather than reflecting a test-taker's disability.
- A prohibition on pre-employment medical examinations, as some tools may cross the line from being hiring tools to being medical examinations, especially around personality assessment.

The challenge with the ADA is that claims must be brought by individuals and are thus reliant on individuals having the knowledge and means to challenge discriminatory tools and practices. This was the first mention of a repeated theme throughout our discussion of policy: the inadequacy of approaches based on individuals asserting their rights.

Reeve Givens highlighted a recent report where the Center for Democracy and Technology was a signatory, **“Civil Rights Principles for Hiring Assessment Technologies”**. At a high level, it lays out five principles:

- 1. Non-discrimination:** assessments should not discriminate based on protected characteristics (e.g., gender, disability, etc.).
- 2. Job-relatedness:** assessments should only measure traits and skills important to the job.
- 3. Notice and explanation:** clear information about assessments, in order that applicants can request accommodations or understand how the test may discriminate against them.
- 4. Auditing:** regular and thorough examination of assessments to check for discrimination and job-relatedness.
- 5. Oversight and accountability:** new legal and technical standards should be developed, and regulators should be able to investigate and hold organizations accountable for ensuring equal opportunity in their use of hiring assessments.

Reeve Givens pointed to the 2019 Algorithmic Accountability Act as an

example of legislation mandating the auditing of systems for potential bias. Reeve Givens then discussed specific **challenges with disability regarding AI tools in employment.** The challenges include:

- Lack of training data makes it extremely hard to build tools that understand the full range of a person’s abilities.
- Training data is typically drawn from the existing “successful” workforce and makes assumptions about an individual’s potential based on a general crowd. This frequently means making decisions based on stereotypes and assumptions, rather than specific consideration of a candidate.
- The most common method of examining hiring procedures and tools for bias in the US (United States) is a statistical method called the “four-fifths rule,” which has significant shortcomings when applied to the representation of people with disabilities.

Reeve Givens concluded by emphasizing the need to move the conversation about limitations in hiring tools to employers, who shape the market for the tools and have significant influence on them with their purchasing power.

Julia Stoyanovich then introduced the concept of the employment funnel and described automated hiring systems as the modern gatekeepers of economic opportunity. She emphasized that even aside from bias concerns, there are basic questions about whether automated hiring tools work or do what they say they do, drawing attention to Arvind Narayanan’s presentation on “How to

What data set would you be running through that in any statistical way would show how people are being screened out versus non-disabled people? When disabilities manifest in so many different ways and you often won’t have statistical significance in the number of candidates coming through.
—Alexandra Reeve Givens

recognize AI snake oil” that categorizes employment screening AI as “fundamentally dubious” in its validity.

Stoyanovich used the term “automated decision systems” (ADS) to describe the general class of system that make up the hiring funnel. Their stated goal is to improve efficiency and promote equitable access to opportunity. Most of them bill themselves as AI because “AI sells,” even though they may not actually use AI technology such as machine or deep learning. Instead, these systems use standard algorithmic systems or decision trees. These systems make decisions consequential to people’s lives and livelihood, by themselves without human involvement or by providing human decision-makers with tools and data.

While the dominant industry sentiment is that “regulation will stifle innovation,” . . . it is not just the industry alone that gets to decide. —Julia Stoyanovich

Currently, a lot of debates are going on about what specific regulatory frameworks should be used. She highlighted the work of New York City’s ADS Task Force, which recommended the use of such systems only if they improve innovation and efficiency in service delivery, and a recent New York City Council bill regulating the use of algorithmic tools in hiring.

Stoyanovich concluded by discussing the need to strike a balance between technical optimism and technical bashing in assessing ADS, and the need to go beyond purely technological solutions to propagate change back into the world. In particular, she identified a need to expand thinking about systems in the future of work to include the potential for creating new opportunities and forms of work that may benefit people with disabilities.

Following the panelist presentations, we had a chance to ask questions. One of relevance was **how jurisdictions outside the USA**

are approaching AI in employment, particularly novel approaches to policy:

- Reeve Givens discussed European regulatory regimes, which she characterized as moving slowly but with significant impact once regulation comes into force, such as the recent case of the General Data Protection Regulation (GDPR). She felt that the European regulations still largely focus on transparency, putting an excessive burden on the individual to know how they may be discriminated against and take action.
- Stoyanovich pointed to the Canadian federal government Directive on Automated Decision-Making, which use an impact assessment approach to the government's use of ADS. She believes this is the right direction to go and that there are larger lessons in the directive for the use of ADS outside the federal government.

We also discussed balancing monitoring for discrimination on disability with people's right or desire not to disclose disability. Reeve Givens floated the possibility of an auditing co-op of people with disabilities who voluntarily share their data with a trusted third party to assist in examining discrimination in hiring systems. Stoyanovich stated that with more transparent systems, it would be easier to assess them with generated data, and that it is important both to audit the algorithms in general and develop methods of explaining to individuals how they were assessed to make it clearer when discrimination due to disability has occurred.

Reeve Givens pointed out that clarity in how the systems make their decisions may undercut the business proposition of AI-based hiring systems, and that there will be a struggle with the industry around issues of transparency and explainability.

The final question was about how to protect against discrimination by disability particularly for individuals who may be more vulnerable

due to intellectual disability or having precarious employment. The panelists believe that plain language statements of rights and examination of heavily surveilled workplaces such as retail, gig work and transportation are important. ADS are used throughout the entire employment cycle, not just in hiring, so it is key to examine and regulate their use in general in the workplace.

What we created

Following on from our learning, we worked on an inclusion challenge co-design activity focused on policies around employment, disability, and AI. Abhishek Gupta from Microsoft, started us off with a presentation on AI lifecycle and ethics with a focus on inclusion from a disabilities perspective.

Gupta echoed many points from the earlier panelists and introduced some new concepts to us, particularly the need to think about AI ethics throughout the entire lifecycle of a system, from ideation and conception to end-of-life. Along with the earlier panelists, he believes that better education about AI for citizens is needed and pointed to the example of University of Helsinki's free course on AI for non-experts. Gupta also gave general areas of AI ethics to prompt further thinking:

- Bias and fairness
- Privacy
- Interpretability and explainability
- Traceability and auditability
- Security

The group was given three AI and Work inclusion challenges that

Abhishek Gupta is the founder and principal researcher at the Montreal AI Ethics Institute and a machine learning engineer at Microsoft

included a description and question to consider and then divided into three groups to collaborate on ways address them:

Challenge 1

We now have an increased number of people working remotely, you are seeing the use of remote workplace productivity monitoring.

The use of traditional metrics in evaluation of employee productivity can affect people with disabilities more so when things like tone of message, frequency of messages, speed of responses, etc. can be used in evaluation such as on Slack channels by an automated bot for a sales team's performance. What are some ways that we can create metrics that are more inclusive?

Approaches developed

- Emphasizing results-based metrics as well as process-based ones, to better allow for the kinds of creative approaches to work that PWDs can excel at.
- Discussing metrics as part of an individual's accommodation plan and supporting worker participation in the development of individualized metrics.
- Aiming for greater transparency in metrics, so that it is clear what is being measured, and why?

Challenge 2

In the hiring process, there were a lot of discussions last week on the potential places where discrimination can enter the picture. In the use of AI, firms have an additional veil that they can wear in that the systems are not human-interpretable. What accountability measures can we request that make disparate outcomes more explicit, especially in ensuring compliance to legal standards like Canadian Human Rights Act?

Gupta explained interpretability as distinct from explainability to help



the group think about the challenge:

- Non-interpretable results are ones where even the developers of the system do not know why the system came to the decision it did, which is sometimes a problem with machine learning systems.
- Non-explainable results are ones where it is complex to explain why the system came to the decision it did, and difficult to put into plain language understandable by non-experts.

Approaches developed

- An emphasis on regulation, with clear guidelines for how systems are to be used.
- Auditability, with systems being subject to regular examination.
- Systems must be able to clear the bar of explainability, making it possible for non-experts to examine why they came to certain conclusions.

The group also emphasized that legal compliance is a low bar to clear, and that it is important to think about how systems may support a more diverse range of candidates, rather than simply not discriminating based on a legalistic framework.

Challenge 3

Privacy with disability data has more severe implications because of the smaller sample sizes so traditional techniques like k-anonymity do not work well. Disclosing such data to employers to request for accommodations is essential but creates privacy risks. Last week, we covered the subject of potentially sharing such data with a third-party data trust that can help track hiring outcomes to make assessments on whether discrimination might be taking place. From a public trust and policy perspective, what measures will permit more open data sharing with such a data trusts that does not compromise the privacy rights of people, especially those with disabilities whose data carries extra sensitivity?

Approaches developed

- A requirement for plain language explanation of the use, collection, and access of personal information.
- An individual ability to manage sharing data as different people have different levels of comfort with sharing the details of their disability.
- The ability to view, change and remove data.
- An emphasis on the credibility, transparency and trustworthiness of the data holder.

What it means

From our learning, discussions, and co-creation activities we developed the following high-level conclusions about ways to address inclusion in AI systems in employment through policy:

Policy must do more than support individual advocacy

It was repeatedly emphasized that an effective policy framework requires much more than empowering individuals to pursue legal claim of discrimination due to disability. The framework of individuals asserting their rights have been violated privileges those with knowledge and access to resources, and thus has a particularly exclusionary effect on those who may not know their rights or lack the means to pursue legal claims.

Two main strands of thought on building more robust policy frameworks arose in discussion:

- The need to educate citizens more broadly on issues in employment related to AI specifically and technology generally, so that people are better informed to assess information, follow debates and participate in advocacy.
- The need to regulate the use of AI in employment and push back on industry claims that any regulation will stifle innovation. It is possible to balance regulation and innovation, particularly through legislation

and regulation that aims not to mandate specific technologies be used or not used, but that lays out responsibilities for ongoing impact assessment and remediation.

Policy should support transparency in systems

Both our speakers and our co-designers identified transparency and the related issue of explainability as key to reducing the potential for discrimination. We need to know why these systems are coming to the conclusions they are coming to, and it is unacceptable that systems with so much impact on people's lives and livelihood operate as black boxes.

In particular, the ability to audit systems for discriminatory outcomes in a variety of ways was emphasized as important, along with clarity in the nature of assessments and metrics to justify job-relatedness. Without individualized information about assessments and metrics, people with disabilities will be unable to pursue individual remedies when discriminated against by these systems, and without general regulation and ongoing auditing, the overall integrity of the systems cannot be assured.

Policy should focus on the entire employment cycle

While a lot of emphasis is placed in the discussion of AI in hiring systems, it was pointed out that AI-based systems are increasingly used by employers throughout all stages of the employment cycle. Policies should aim to address discriminatory practice in the use of AI in the workplace generally, not just in the hiring process.

Policy should support broadening opportunities in employment, not just reducing discrimination

As in the previous conclusion, there was extensive discussion of how AI could offer support for new forms of work and increased opportunities for people with disabilities. There is a strong desire for a world where

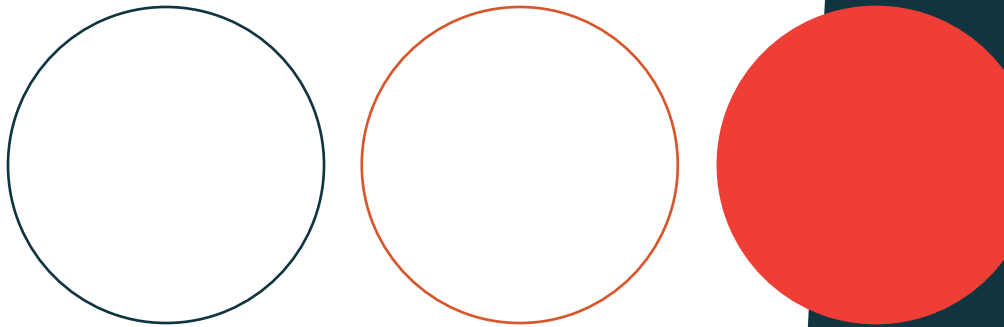


AI systems are not just vectors of discrimination to be overcome in employment for people with disabilities, but aids in supporting greater inclusion. A robust policy framework for AI in employment should aim to support positive uses of the technology as well as guarding against the dangers of discrimination.

TOPIC 3

Inclusive AI

Making Artificial Intelligence
Inclusive for Hiring and HR



What we learned

In weeks three and four, the study group's focus was discovering, understanding, and drawing some of the potential problems that AI raises in the hiring process and brainstorming ideas to make this process more inclusive for persons with disabilities.

We looked for insights for the development of standards and regulations that support diversity within data systems--particularly regarding the ethical and transparent collection of data and the development of models and decision-making structures that recognize and respond appropriately to diversity, complexity, and complexity unexpected needs.

Our panelist discussion on making AI inclusive for hiring and HR featured Dr. Shea Tanis and Rich Donovan.

Tanis commented that the move towards hiring being an entirely online process already excludes large groups of people with disabilities, for example both existing and declining abilities (such as loss of sight or physical ability over time), and that HR should be encouraged to look outside their predetermined contexts of how they seek and interview potential employees. She envisions broadening the avenue of

Dr. Shea Tanis is the Director for Policy and Advocacy at the Coleman Institute for Cognitive Disabilities at the University of Colorado. She is nationally recognized for her expertise in applied cognitive technology supports, cognitive accessibility and advancing the rights of people with cognitive disabilities to technology and information access.

Rich Donovan is CEO of the Return on Disability Group and is a globally recognized subject matter expert on the convergence of disability and corporate profitability. He has spent more than ten years focused on defining and unlocking the economic value of the disability market. In 2006 Rich founded Lime, the leading third-party recruiter in the disability space, where he worked with Google, PepsiCo, Bank of America/Merrill Lynch, IBM, TD Bank and others to help them attract and retain top talent from within the disability market.



technology use to better showcase individuals who might be left out of normal hiring processes.

The second presenter, Rich Donovan, noted that two-thirds of companies outsource their hiring application platforms, and that they typically have a range of accessibility barriers. The tendency of the hiring process to become increasingly centralized on a few platforms carries significant risks to inclusion. Getting recruiters and hiring managers to rethink disability as a potential point of connection and value with candidates rather than a barrier is already a challenge, before hiring systems put further barriers in place.

In response to a study group participant question about how to support fitting people to jobs rather than jobs to people, Tanis and Donovan both agreed that this would be a positive future direction. Rich stated that organizations that focus on people-centred hiring tend to outperform job-centred ones, and that removing barriers to hiring PWD will increase the pool of suitable candidates for this approach. Tanis added that trends towards building jobs around a person rather than fitting a person into a job align with longstanding practice in customized and supportive employment. A picture emerged of the potential for systems to help match people's skills with the work an employer needs done, creating new forms of work that would enable greater inclusion.

Both panelists see the possibility of a new reality emerging from what Tanis calls the large-scale "work at home experiment" of the pandemic, which has gone from the exception to the rule for certain jobs and led to innovation and creativity by employees in selecting tools and structures to remain productive in different contexts. Donovan notes the expense of large, centralized office space, and said his best guess was that in the future a hybrid model with more work from home and smaller distributed offices will emerge. These structures could better

accommodate difference, and harness that difference to improve work.

Dr. Jutta Treviranus of the Inclusive Design Research Centre noted that AI is frequently being deployed to replace managers and reduce the possibilities for flexibility. She characterized AI as a power tool that can optimize processes, with the inherent danger of optimizing already exclusionary processes.

There were a number of audience questions about the replacement of management by humans with management by AI. In particular, the surveillance aspect that aims to closely manage employee productivity through means such as counting keystrokes, monitoring internet traffic or watching employees through webcams has been around for a long time, and is being accelerated by AI.

Tanis believes that onus must be placed upon employers to disclose what AI tools are in use throughout the employment, from recruitment to performance measures. It is particularly important to know in advance of accepting a job in order to assess your fit and the need for discussion of accommodations.

The panel closed by discussing the impact of AI on cultural capital and diversity in organizations. Tanis felt that authenticity is often missing from such discussions, and that it is important to hire people with disabilities as employees, not just consultants or volunteers. Donovan and Treviranus discussed approaches to various measures of diversity, particularly the concern that AI will entrench a “winner takes all, one size fits all” approach, rather than one that addresses the full complexity of employment, especially employment for PWD.

We’ve been sawing wood for quite some time, but a power tool makes it more efficient, effective whatever optimizes it. The same thing with AI so that the strategies we’ve used before, we’re increasing the effect of that, both the risks and the potential opportunities.

—Jutta Treviranus



What we created

[Nugget.ai](#), a company that uses organizational psychology research to build artificial intelligence algorithms to measure candidate and employee skills for hiring and development was invited to share their work for critique and discussion. In essence this means nugget.ai uses a combination of machine learning, manual evaluations, and discussion with hiring managers; this gives them an opportunity to discuss whether or not certain requirements are actually essential. Marian Pitel and Melissa Pike of nugget.ai presented us with details of their work at nugget.ai, and we offered comment and critique throughout.

We used nugget.ai as a case study and applied what we'd learned and created from previous panels and modules to examine their processes as a company and reflect and critique their decisions so far in building their technology. Marian outlined the process of the technology when working with clients on hiring new staff in particular:

1. Identifying important and relevant skills for the job
2. Developing approaches to measuring candidates' skills (capabilities and level of competencies)
3. Making recommendations and decisions about hiring

1. Identifying relevant skills

Identifying relevant skills for a position uses a combination of generic skill analysis, typically expected of any specific occupation regardless of company or region, and specifics of the company in terms of areas like culture, team dynamics and client profile. Generic skills analysis

Marian Pitel is Head of Research at nugget, currently completing a PhD in Organizational Psychology. Her research has focused on job simulation.

Melissa Pike is Product and Research Associate at nugget, currently completing a PhD in Organizational Psychology. Her research has focused on improving the hiring process.



makes use of occupation databases like O*NET, while specific analysis is based on the context of the hiring organization.

This stage is important because without an accurate understanding of what a position requires, recruiters and companies will look for employees that are insufficiently representative of groups with different experiences and circumstances. It's also the first part of the hiring funnel, a concept that came up in previous discussions; getting things wrong at the first step makes it difficult to get things right in succeeding steps.

The nugget.ai team noted that it's difficult to distinguish between skills that are necessary and skills that are nice to have, and companies themselves don't always have this figured out, especially regarding what skills are needed at the start versus the ones that can be trained. They also discussed the legal issue of "bona fide requirements", which companies may knowingly or unknowingly hide behind to unjustly exclude certain candidates.

Connected Reflections

- How do we ensure that bona fide requirements for a position are valid? There is a legal test, but it takes legal action to get to the point where that test might be applied. Particularly at the intersection with technology, requirements around physical capability, driver's licenses or "clear speech" can exclude people with disabilities when solutions exist. Should an onus exist on companies to invest in technology or process change that would change the nature of supposed bona fide requirements?
- If machine learning algorithms scan job ads to extract information about potential skills, the content of the job ads forms a major source of the training data. There is a risk of training data that is poor quality or discriminatory excluding people with disabilities. Nugget.ai acknowledged the challenges and limitations of job ad data and

stated that some of the work of building algorithms has been to try and account for these issues, such as identifying and managing issues of bias in job ads as commonly written.

2. Measuring

Once the needed skills have been identified, they must identify the best ways to assess incoming candidate skills. It's key to focus on capabilities needed in the role. There's an increasing focus in hiring on skills rather than education and grades but assessing current candidate skills and potential for future skill growth is complex. This is especially true for hiring people with disabilities due to normative expectations and narrow ideas of what constitutes an "ideal" candidate.

Nugget.ai has a number of different considerations when approaching measurement:

- Different approaches to skills assessment using methods like competency tests or questionnaires.
- Consideration of compensatory skills and experiences, even for "must-have" requirements.
- Appropriate comparison groups: what is the right group to compare a candidate's skills against?

Connected Reflections

- The question of the use of assistive technologies when taking tests to measure skills was raised; it was pointed out that testing is more accurate when it more closely simulates the day-to-day circumstances of a job, rather than in a vacuum where technologies like spelling and grammar checkers are artificially unavailable. One size fits all testing in particular can exclude people with disabilities and their personal innovations and technical supports.
- Accommodations when assessing skills using tests must also consider individual candidate needs and varying levels of familiarity with particular assistive technologies. Accommodations should not

be left only to the employer's discretion but assessed by professionals familiar with disability accommodation.

3. Recommendations and decisions

Finally, the automated process presents potential candidates for the job to the hiring manager. They use a variety of approaches to presenting this information, but the most interesting for our purposes is the concept of grouped recommendations that present different groups of candidates to clients. This allows highlighting candidates who may not tick every box of the job posting but have other characteristics that might make them an excellent "unconventional" hire.

Nugget.ai is also working on how to present recommendations for the candidates themselves. Currently, they display a profile layout where candidates can see some of their results, such as how well they scored relative to other candidates.

Connected Reflections

One question from the audience was regarding what a system designed from the beginning to recruit non-standard candidates would look like, one "built for diversity rather than trying to correct for diversity after." Some of the building blocks of such a system might already exist in approaches like the grouped recommendations described above.

4. Discussion on "Ideal Candidates"

Following the nugget.ai exercise, the study group discussed two questions:

- How can an organization leverage the competitive advantage of using a candidate's differences to their success?
- How can organizations begin to think differently about what it means to be "ideal" for the job?



One major point of discussion was on the need to realign thinking about people as individual workers to an approach that incentivizes teamwork and collaboration. Who is “ideal” for a job is a different question when work is envisioned as interdependence rather than individual striving, and diverse teams will be better reflective of populations being served.

The idea of the “ideal” candidate was also discussed as something that needs to be challenged and unpacked in terms of the criteria being used. Particularly to diversify candidate pools, the current focus on education and employment experience should be shifted towards capabilities and skills. This shift in focus would help open up employment to people with disabilities who commonly have non-traditional career paths and valuable experience in areas beyond employment roles.

The study group also specifically discussed how AI could be used to support more diverse recruitment practices and imagined some scenarios:

- If AI were able to gather information and present profiles highlighting the unique skills and experiences of candidates, it could help those hiring more easily consider and compare a broader range of potential hires.
- AI could be used to analyze hiring systems and assess diversity considerations.
- AI could assist in the development of training to help hiring managers broaden their perspectives.

Companies are often looking for a kind of profile that is uniquely suited for their culture, their team dynamics, their clientele profile, so often their ideal candidate does not cleanly fall into this prototypical box.

—Marian Pitel

This part of the discussion returned to the ongoing theme of wanting

AI to make a positive difference in the experience of people with disabilities in employment, rather than simply avoiding discrimination.

What it means

In this final section of our study on the future of work and disability, we more deeply explored issues around AI's role in inclusion in hiring and human resources generally. Dr. Shea Tanis and Rich Donovan discussed in detail some of the concerns arising from the increasing centralization of hiring technologies onto a small number of platforms, most of which use AI or other automated decision technology in ways that are not always clearly understood; there is risk both in the technical accessibility of these platforms for use by people with disabilities, and in the potential for algorithmic discrimination that encodes and entrenches bias. We also gained valuable insight from Marian Pitel and Melissa Pike of nugget.ai into the complex considerations of a start-up company building hiring technology based on AI and shared our thoughts with them about how to improve the inclusion of their platform.

Some themes from previous sections return in our high-level conclusions here. We highlight them under two main categories:

1. Importance of transparency and disclosure in employment systems and processes

We need much more information and transparency about the scale, role and behaviour of automated systems in both hiring and the entire employment cycle. We learned previously in our section on policy about the importance of establishing policies that make this an explicit goal, but there remain many questions as to how to accomplish transparency and disclosure, especially at the complex intersection of AI and human decision-making.

Specifically, we learned about the importance of employers disclosing what technologies are used both in hiring, and on the job in areas such as performance measurement. Longer-term trends in using technology to survey and manage employees are being accelerated by AI, machine learning and similar technologies, and how these systems work is sometimes mysterious even to those who make use of them. Designing employment systems and processes with an explicit goal of transparency and closure does not eliminate against the risk of entrenching exclusionary practices, but it can help significantly in reducing it.

We also experienced modelling of transparency by the representatives of nugget.ai, who openly discussed their processes and technology at a high level and received feedback from us about their work. The involvement of people with disabilities throughout the cycle of design and operation of employment systems is critical for making sure their wide range of complex needs and unique experiences is not missed in the early stages.

2. Shifts in hiring processes and systems offer both risks and opportunities

We learned several times that the future of work may be trending away from a focus on the job description towards people-based and/or skills-based hiring: what does a particular person bring to the employer in terms of their skills and experiences? Where do they fit in with various teams and overall organizational mission?

From the opportunity side, such a shift could be valuable to people with disabilities in its emphasis on wider forms of contribution and non-traditional experience. Combined with the shift to working remotely during the COVID-19 pandemic, there is a chance for a combination of technological change and shifts in the nature of employment to create better work opportunities for people with disabilities, and

for employers to more easily be able to identify and benefit from their work. It is also important to remember that the shift has created additional barriers for people with disabilities in other areas of employment, as not all work easily transitions to remotely working, and employer-provided facilities and service that may include specialized assistive technologies or other supports may not be available off-site.

There is also risk and challenge. One part is the previously mentioned attitudinal one where employers underestimate or stereotype the abilities of people with disabilities or have a too-narrow sense of what is needed to do a job that causes people with disabilities to be excluded behind questionable “bona fide requirements”. It is important that skills-based approaches to hiring be validated and examined, with an eye to whether the skills identified are both correct and correctly assessed, particularly accounting for differing approaches and the possibilities of assistive technologies or modified work. Employers must also think carefully about the issue of “culture fit” in hiring and avoid inadvertently creating a homogenous culture that lacks a needed range of perspective including people with disabilities.

AI is a nexus where the opportunities and challenges of large-scale shifts in the nature of work and hiring for people with disabilities meet. We must pay careful attention to both.

Overall Analysis



THE CHALLENGE: *Entangled Systems*

While our focus was on AI and other new technologies, it proved impossible to cleanly separate discussion of them from “old” technologies and even older attitudes towards people with disabilities in the world of work. We heard frequent stories, some very personal, about rejection and underestimation in employment, and about technology creating barriers and challenges both when searching for a job and when performing it.

In trying to put our focus on AI, we do not want the larger concerns of this picture to be obscured. Even in the unlikely case that any AI involved in a theoretical hiring system could be made perfectly fair, it will be of little consequence to the applicant with disabilities if they are unable to submit a job application because the HR department’s web application is inaccessible, or the hiring manager with the final say believes that an applicant with a disability will be unable to perform the job.

AI systems risk carrying negative attitudes about people with disabilities in their learning models, and many training models for AI rely on large volumes of data that may reduce the unique strengths and needs of people with disabilities to statistical noise. But the specific characteristics of these systems are influenced by and influence the larger world, so a discussion of future possibilities must touch upon that larger world.

THE RISK: *Embedding the status quo*

We heard concern throughout, that current trends in the use of technology in employment (of which AI-based systems are only a



part) are continuing or even exacerbating barriers that impact the employment possibilities of people with disabilities. Broadly, these trends include:

- Basic issues of the accessibility of technology used throughout the employment cycle, requiring accommodation or expensive retrofitting. This barrier impacts people with disabilities every step of the way when seeking, performing, or leaving employment.
- Definitions of jobs that are narrow in terms of the required skills, how the work is to be done, and what constitutes an “ideal” candidate that filter out people with disabilities.
- Hiring and organizational structures that, even if well-intentioned, do not sufficiently support people with disabilities in being successful.
- Systems and processes that lack clarity regarding areas like the reasons for hiring decisions or how someone is performing on the job.

All these trends feed into specific challenges for AI-based systems in employment for people with disabilities, including:

- Parts of the system may not be built with accessibility in mind, either to formal accessibility standards such as WCAG, or to the broader world of inclusive design practice.
- Training data used to hire, assess, or otherwise analyze people with disabilities in employment situations may not account for the fullness of their strengths, needs and possibilities.
- Systems operate as black boxes around their decision-making, creating challenges around even basic accommodation requests, and potentially embedding normative stereotypes that discriminate against people with disabilities.

THE OPPORTUNITY: *Systems for inclusion*

We also heard hope throughout, that effective interventions might help to remove barriers to the employment possibilities of people with



disabilities. There were many ideas about how AI-based technology could work to support inclusion rather than embed a discriminatory status quo, including:

- Hiring systems that could highlight the strengths and unique experiences of people with disabilities, allowing organizations to discover candidates they might otherwise miss.
- Adaptive, AI-based technologies to support the success of people with disabilities throughout employment; in particular, the “power tool” effect of AI might be applied to areas of accommodation such as captioning, image description or speech recognition.
- Approaches in using data to train AI systems that could recognize and support diversity.

THE PRINCIPLES FOR RECOMMENDATIONS:

Transparency, involvement, protection, and innovation

Three individually complex domains converge in matters around AI, employment, and people with disabilities. We can summarize them as follows:

- 1.** The rapidly evolving world of AI, smart systems, and related technology, perhaps best encompassed by what Dr. Julia Stoyanovich called “automated decision systems” that are meant to enhance, supplement, or replace human decision making.
- 2.** The changing nature of work, both in Canada and the world.
- 3.** The highly individualized needs and strengths of people with disabilities, and how they relate to a world that are often not designed for them.

Converging complex domains have no simple paths to seize their opportunities and avoid their risks. These recommendations should



be treated as preliminary, non-comprehensive and guided by the following three high-level principles with the goal of reducing the likelihood of embedding the status quo and increasing the likelihood of systems for inclusion.

PRINCIPLE 1:

Ensure transparency and disclosure in employment technology and processes

A persistent thread in both the panel presentations and learning group discussions was uncertainty and unanswered questions, particularly about the use of technology throughout the entire employment cycle. What technologies are used, and how? What logic underlies both skill-based testing and more nebulous technologies claiming to measure characteristics like trustworthiness, especially when based on AI technologies such as machine learning whose models and algorithms may not be understood even by their creators?

In an environment where people with disabilities are expected to proactively ask for accommodations and advocate for themselves, disclosure of the nature of technologies used in areas like hiring new employees and assessing existing ones is a bare minimum requirement. Transparency and disclosure will also support continuous improvement by making it easier to identify discriminatory aspects of a system or process and help to guard against the problem of “AI snake oil”.

PRINCIPLE 2:

Promote the involvement of people with disabilities

A core tenet of Inclusive design is the inclusion of people with disabilities in the design process, due to the strength of their highly individualized lived experiences in supporting designs that can accommodate a wide range of needs.

Specifically, regarding AI, the needs of people with disabilities must be



treated as important points of data to inform the system design, rather than statistical noise to be filtered out. The involvement of people with disabilities early in the design helps guard against unchallenged assumptions about how “everyone” experiences the world that led to undesirable outcomes like discriminatory technologies and costly retrofitting.

PRINCIPLE 3:

Protect human rights and society while supporting innovation

The regulation of technology can take many different forms, including outright legal bans, government regulatory bodies, or voluntary standards development between different stakeholders. Increasing scrutiny and regulation of AI-based technologies both generally (such as the recent European Union proposals for regulating AI) and in employment specifically (such as the New York City Council bill regulating the sale of automated employment decision tools) appears to be the trend. The current issues of social media privacy and misinformation may have left many particularly sensitive to the consequences of allowing powerful technologies to shape society without sufficient regulation.

We heard specific praise for approaches based on impact assessment (such as those outlined in the recent Canadian government Directive on Automated Decision-Making) in evaluating the approaches to take when weighing potential benefits and risks. Any impact assessment process should specifically consider the needs of people with disabilities, including direct involvement of those with lived experience.

Specifically, regarding employment technologies, the transparency and disclosure needs in the first point are a prerequisite to allow different stakeholders a voice, and legislative and regulatory steps should be taken towards achieving that goal to the benefit of all.



THE RECOMMENDATIONS:

Stakeholders

Following from the principles above, we offer some high-level recommendations for different stakeholders in the employment ecosystem.

Employers and other institutional users of employment technologies

This category covers those who might be described as a customer or similar role regarding an automated decision system involved in employment matters. It is recommended that:

- Employers proactively use their influence on the market for employment technologies to ensure purchased systems both meet basic accessibility criteria and go beyond them into specifically addressing the risks that the system may exclude people with disabilities.
- Employers engage people with disabilities directly in evaluating their current usage of employment technologies, particularly with an eye to impact assessment and unintended consequence.
- Employers should seek opportunities to directly empower employees at all levels to assess the validity and effectiveness of employment technologies used to assess and manage their work; while this may benefit employees with disabilities in particular, it will benefit the organization generally.

Legislative and regulatory bodies

This category broadly covers both government entities and regulatory and standards-making bodies. It is recommended that:

- In collaboration with other stakeholders, develop and enact laws and regulation establishing requirements for the disclosure of information about employment technologies, especially regarding the AI-based systems, and such that it is possible for independent actors to assess

their impact on people with disabilities.

- Establish a general approach to the assessment and regulation of technology in employment that includes consultation and involvement of people with disabilities.
- Where necessary, enact legislation, standards and regulations around specific combinations of contexts and technologies where there is a foreseeable impact or risk on people with disabilities.
- Require post-secondary education institutions who provide data science and AI training to include courses on data systems transparency and inclusion.

Creators of technologies

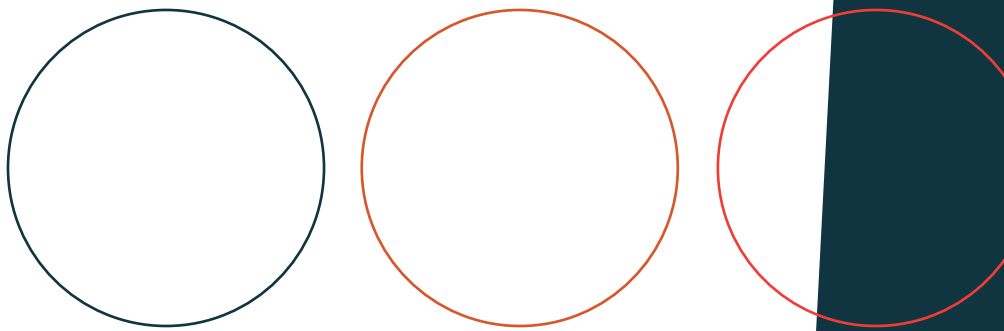
This category covers those in a vendor role or similar regarding automated decision systems involved in employment matters as well as those who design and develop AI-based systems. It is recommended that:

- Creators involve people with disabilities in the development of their technologies, from the earliest possible point of the design.
- Creators specifically investigate directions for their technologies that support the needs and potential of people with disabilities.
- Creators embrace designing for people with disabilities as a competitive edge in building better products.

People with disabilities and their allies

- Continue to advocate for the rights of people with disabilities which may include filing lawsuits, regulatory complaints, or appeals to human rights bodies.
- Participate in creation of data sets that better reflect the experience and interest of people with disabilities.

ANNEX



Resources

All of the webinars and activities from the Future of Work and Disability study group are documented on the Future of Work and Disability section of the [We Count](#) web site.

[ACM ASSETS 2019 Workshop on AI Fairness for People with Disabilities](#)

[AI Explainability 360 by IBM Research](#) (Resource Aggregator and Community Site)

[AI Fairness 360 by IBM Research](#) (Resource Aggregator and Community Site)

[AI Fairness work at IBM](#) (Article)

[Considerations for AI Fairness for People with Disabilities](#) (Article)

[Data Responsibility Comic Book Series](#) by Falaah Arif Khan, Julia Stoyanovich and Eleni Manis

[Designing for ethical AI](#) (Article)

[Elements of AI free online course](#) from University of Helsinki

[Environmental Scan: Addressing Inclusionary Practice in Canadian AI Firms](#) (Article & Presentation)

[Environmental Scan: Assessing Inclusionary Practice in Canadian Data Services](#)

[Environmental Scan: Canadian Postsecondary Education and AI Ethics](#) (Article & Presentation)

European Commission's Ethics Guidelines for Trustworthy AI, and associated self-assessment process - <https://ec.europa.eu/digital-single-market/en/news/assessment-list-trustworthy-artificial-intelligence-altai-self-assessment> (Links to an external site.)



[Korn Ferry Global Survey: AI Reshaping the Role of the Recruiter](#)

[Making Artificial Intelligence Inclusive for Hiring and HR](#) (Podcast)

[US Equal Employment Opportunity Commission](#) (Website)

[We Count Project](#), Inclusive Design Research Centre

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About the collaborators

Claire Andrews

Claire Andrews is a research assistant at the Inclusive Design Research Centre and worked on the Future of Work and Disability Project. Claire is a graduate of the Masters of Inclusive Design Program at OCAD University and has a Master of Science in Occupational Therapy.

Chris Butler

Chris Butler works as a courier for Surrey Place and Good Foot Delivery. He enjoys hanging out with his housemates, spending time on his iPad, and reading Star Trek, Doctor Who and X-Files books.

Theodore (Ted) Cooke

Ted Cooke lives in Peterborough and works as a software developer and accessibility consultant.

Katherine Gallagher

Katherine Gallagher works as a researcher for Incipio Modo (www.incipiomodo.com). She has her own website for autism advocacy at www.spectrumexpressions.com/ and writes articles for Autism Canada's newsletter.

Alan Harnum

Alan Harnum is a software developer and design researcher at the Inclusive Design Research Centre. His particular interests include inclusive design practices in software development, using technology to support the work of social justice movements, and accessibility and inclusion in gaming.

Kevin Keane

Kevin Keane is an Information Security, Networking and Privacy professional living in Toronto. Kevin suffered a serious sports injury which resulted in a partially crushed spinal cord due to a break and

slippage of the vertebrae. Kevin underwent surgery to fuse vertebrae with instrumentation to prevent further paralysis. Kevin had started a company prior to the injury that would automate the functions of buildings in order to address the needs of senior populations to help them age gracefully at home. Kevin's renewed focus is to continue to advance the agenda of those that find life difficult, by using technology and advocacy to ensure those that want a better life can succeed.

Mala Naraine

Dr. Naraine has an Ed.D (2005) in Developmental Psychology and Education from the University of Toronto, Ontario Institute for Studies in Education. She completed a 3-year Postdoctoral Fellowship (2013) in the Inclusive Media and Design Centre at Ryerson University supervised by Dr. Deborah Fels. Dr. Naraine is a Research Associate with the Centre for Research on Work Disability Policy (CRWDP). Dr. Naraine is a passionate human rights and accessibility issues expert. For over 15 years she has helped organizations and Human Resources professionals and educational institutions find the right solutions in accommodation of disabilities in the workplace and in post-secondary environments. Self-motivated and self-directed, Mala embodies in her own life the very principles of what it means for a person with a disability to live autonomously.

Runa Patel

Runa Patel is currently working as an engagement support specialist at Microsoft. A 2020 graduate of York University in Psychology, she also has a diploma in Social Work. Throughout her career Runa has been actively contributing to make a difference in the lives of others and is currently a board member of Access to Accessibility and a research assistant with OCAD University working on STEM-related accessibility projects. She hosts the podcast "Equitable Education," and in her spare time enjoys drawing, colouring, coding, playing audio games and baseball, performing music, volunteering, and spending time with Valora, her Labrador Retriever guide dog.



Sricamalan (Sri) Pathmanathan

Sricamalan Pathmanathan is the Human Resources & Employment Equity Coordinator at Ryerson University. He has a long history of community participation and leadership in organizations including the Organization of Canadian Tamils with Disabilities (www.octd.ca), Race and Disability Canada (raceanddisability.ca), and the Ethno-Racial People with Disabilities Coalition of Ontario (www.facebook.com/Ethno-Racial-People-with-Disabilities-Coalition-of-Ontario-ERDCO-370001966349953).

David Pereyra

Dr. Pereyra is the FWD Project Coordinator. He holds a Ph.D. from the University of Toronto. At the Inclusive Design Research Centre, David is responsible for outreach, collaboration and community engagement. David developed and maintains a community of expert advisors from the disability community who collaborate in design workshops, accessibility challenge events and sensitivity training activities. These activities are as diverse as setting/learning policies, designing built environments, developing services, creating accessible workflows, and workshops.

Gaitrie Persaud

Gaitrie Persaud is a Deaf artist, model, actress, Deaf Interpreter, ASL coach and infamous dynamic personality. Currently, Gaitrie is a musical performer for MDL CHLD, LAL and international singers. She is also working on her own Deaf BIPOC television series in American Sign Language (ASL) and the play “The Two Natashas” with Natasha Bacchus. Gaitrie recently performed with her group at Buddies in Bad Times for Pride. She is currently building her empire Phoenix the Fire. Her company is a theatre community hub providing workshops, resources, facilitating partnerships to leverage QTIBPOC Deaf Artists & their endeavours.



Ramin Raunak

Ramin Raunak is an experienced customer service representative and data entry professional.

Fran Quintero Rawlings

Fran Quintero Rawlings is a systemic designer, researcher and artist. She is a deeply curious innovator and is passionate about working on projects that improve both the human and design experience. As a strategist, she understands the complex relationship that exists between consumers, organizations and government. She also enjoys curating and provoking important conversations around equity, fairness, wellness and gender through curated public installations and events. She holds a Master's of Design in Strategic Foresight and Innovation at OCAD University.

Vera Roberts

Dr. Vera Roberts is Senior Manager Research, Consulting and Projects at the Inclusive Design Research Centre (IDRC) at OCAD University. Vera is project manager for the Future of Work and Disability project; her primary research area is generating a culture of inclusion through outreach activities and implementation of inclusive technology and digital sharing platforms.

Janet Rodriguez

Janet Rodriguez is one of the organisers of the Toronto Disability Pride March and is a Board member of the Ethno-Racial People with Disabilities Coalition of Ontario ERDCO. Janet is an activist from many sectors of the city.

Cybele Sack

Cybele Sack is a Media Production Professional in Toronto.



Arjun Sawhney

Arjun Sawhney is a PhD student in philosophy at Queen's University. He is currently studying jurisprudence, political philosophy, and the social impacts of artificial intelligence. Arjun hopes that the tools of philosophy can be used to enrich the political, legal, and moral foundations of society.

Christopher Sutton

Chris Sutton is Chief Executive Officer at Wavefront Centre for Communication Accessibility. He provides innovative, strategic and sound operational and leadership experience in the advocacy, education, health and social services, government and medical technology sectors.

Jutta Treviranus

Jutta Treviranus is the Director of the [Inclusive Design Research Centre](#) (IDRC) and professor at OCAD University in Toronto, formerly the Adaptive Technology Resource Centre. She also established and directs an innovative graduate program in Inclusive Design. Jutta has led many international multi-partner research networks that have created broadly implemented technical innovations that support inclusion. These include the Fluid Project, Fluid Engage, CulturAll, Stretch, FLOE and many others. Jutta and her team have pioneered personalization as an approach to accessibility in the digital domain. She has played a leading role in developing accessibility legislation, standards and specifications internationally (including WAI ATAG, IMS AccessForAll, ISO 24751, and AODA Information and Communication).

Ricardo Wagner

Ricardo Wagner is the Accessibility Lead for Microsoft Canada. He believes technology elevates the education, employment, and living standards for billions of people around the world, especially people with disabilities. Ricardo has made it his personal mission to play a



role in that transformation. He is Microsoft's 2019 Hackathon Grand Prize Winner, awarded as the most influential Accessibility Advocate worldwide for Microsoft in 2020, and has won several recognitions including 2019 The Jim Flaherty Award for Leadership in Accessibility and Inclusion (Canada) and Microsoft's Platinum Club in 2018.

Caren Watkins

Caren is a designer, researcher, and educator at the IDRC. She has a Master of Inclusive Design from OCAD University with a focus on the intersection of neurodivergence and Inclusive Design for Learning (IDfL). Caren also coordinates [SNOW](#), a resource of assistive and accessible technology and practices with a focus on IDfL.



Future of Work and Disability

<https://wecount.inclusivedesign.ca/views/fwd/>

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