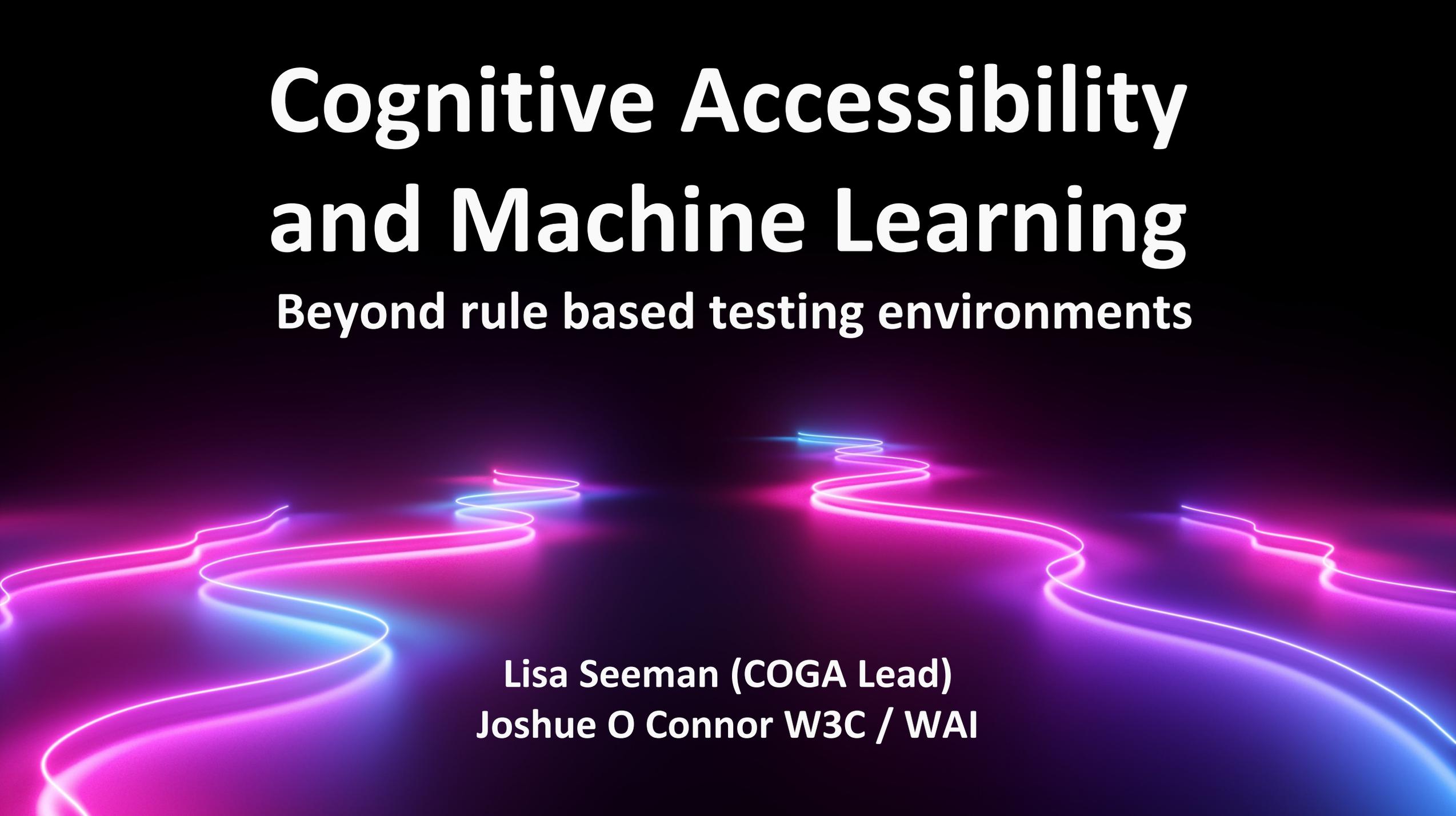


Cognitive Accessibility and Machine Learning

Beyond rule based testing environments



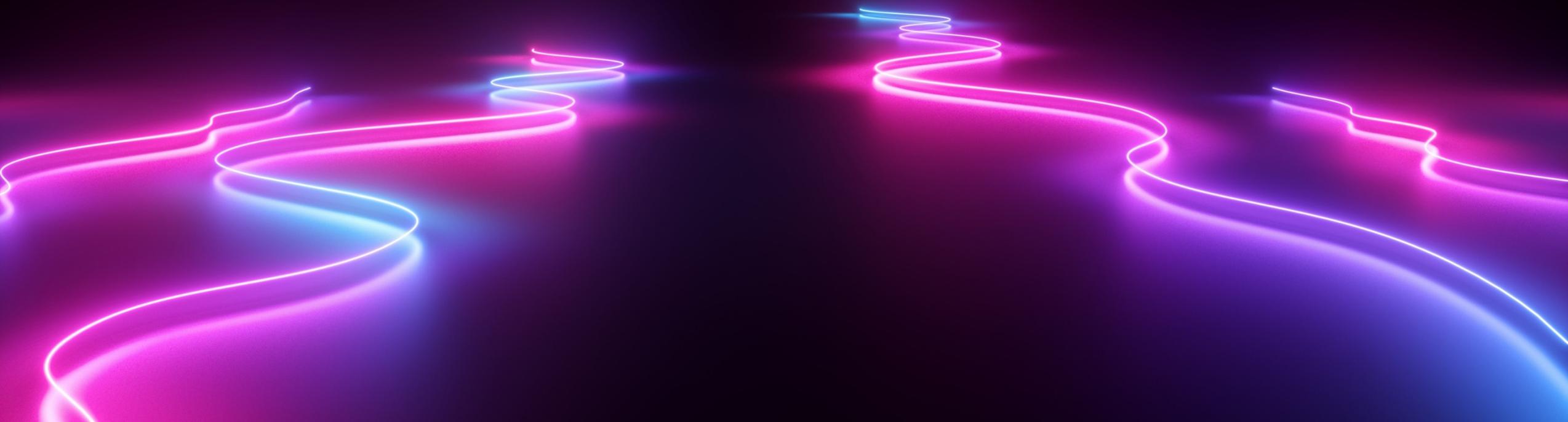
Lisa Seeman (COGA Lead)
Joshue O Connor W3C / WAI

Discussion and goals

1

- How to support people with (cognitive) disabilities via Machine Learning?
- Better testing of support.
- Understand how inclusive design can support better ML.

User Testing/Cognitive/ML



Testing example

2

- Accessibility best practices for people with learning and cognitive disabilities is hard to test.
- Especially when using traditional rule based accessibility testing.

Testing example

- **Making Content Usable for People with Cognitive and Learning Disabilities** has a pattern (4.2.5) **Clearly Identify Controls and Their Use.**
- This instructs designers to use a clear recognizable design for interactive controls.

Testing example – Challenges

4

- Hard to test via current automated rule sets.
- ML could be trained from usability testing.
- Learn what a user group with cognitive impairments may successfully recognize.
- Understand what designs fail.
- For example we could say "likely" any given component may have over 90% certainty that it is accessible.

Testing - Benefits

5

- Bridge gap between the need for user testing and the related expense.
- ML learned experience can be used to test more sites with improved accuracy.

Inclusive design can support ML



Inclusive design can support ML

6

- Inclusive design may help support machine learning performance and vice versa.
- For example, new personalization semantics, published by the APA, introduces standardized semantics.
- They allows web applications to customize the presentation of that content.
- Make it familiar to individuals based on their specific needs and preferences.

Inclusive design can support ML

7

- Semantic tokens allow the association of user-preferred symbols with elements having those semantics.
- These semantics could benefit any application trying to map particular concepts to language.
- ML can support the creation of these symbols.
- Understand both the intent of the content and a related symbol.

New solutions for inclusion

8

- ML holds great potential for helping people with disabilities use the web.
- By adding tools and adapting content to make it more usable.
- This includes adapting the text, design and flow of the content to meet diverse user needs.

New solutions for inclusion

9

- ML can be more similar to how humans think.
- It can fill the gaps when something is not working
 - This item is expensive (eg: dyscalculia).
 - This image is a warning (eg: vision loss).
 - This text seems angry (eg: ASD).

Risks / Warnings



Warning – who is missing from your data? 11

- If people can not use the tools they will not be part of the data
- People with cognitive disabilities can become invisible:
 - Conversational interfaces are not trained for this.
 - Decision making algorithms ignore the traffic of people not using an inaccessible GPS app, etc.

Further work and discussion (APA/RQTF)

12

- Lets collaborate to better identify where there is a nexus between Machine Learning, and accessibility via the:
- Accessible Platforms Architecture (APA) group
- Research Questions Task force (RQTF).



- *Please contact:*
- *Lisa Seeman (COGA lead) lisa.seeman@zoho.com*
- *Joshue O Connor (W3C/WAI) joconnor@w3.org*