Accessiblü

Managed Digital Accessibility Ops

Accessibility Evaluation Report:

ACM Digital Library

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Conducted by: Accessiblü, LLC

For: Library Accessibility Alliance (LAA)

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Summary of Accessibility Findings

Accessiblü conducted a high-level accessibility evaluation of the ACM Digital Library platform to assess its usability for individuals with disabilities. The review was conducted using automated testing tools (Axe DevTools), keyboard-only navigation, and manual inspection for conformance to WCAG 2.2 AA success criteria.

Key Findings

The ACM Digital Library demonstrates several positive accessibility features, including proper semantic HTML structure in many areas and functioning keyboard navigation for primary content access. The platform includes skip navigation links and shows attention to accessibility in its core architecture. However, our evaluation identified significant opportunities for improvement that would enhance the experience for users with disabilities.

The testing revealed critical issues with interactive carousel and slideshow components that prevent keyboard users from accessing important content. Additionally, there are widespread color contrast deficiencies throughout the platform, missing ARIA attributes for dynamic content, and inconsistent form labeling that creates barriers for screen reader users. While the platform's foundation is solid, addressing these concerns would significantly improve access for persons with disabilities and users of assistive technology, allowing them to fully utilize the extensive computing research resources that ACM provides.

Top 3 Issues Identified

1. Keyboard-Inaccessible Interactive Components

a. Multiple carousel, slideshow, and interactive elements throughout the site cannot be accessed or operated using keyboard alone. Profile carousels, content sliders, and browsing interfaces lack proper keyboard handlers.

b. Impact: Keyboard-only users, including those with motor disabilities and many screen reader users, cannot access significant portions of the platform's content and functionality.

c. WCAG Success Criteria: 2.1.1 Keyboard (A), 2.1.3 Keyboard (No Exception) (AAA)

2. Color Contrast Deficiencies

a. Numerous text elements throughout the platform fail to meet WCAG 2.2 AA minimum contrast ratios of 4.5:1 for normal text and 3:1 for large text. This affects secondary text, links, button labels, and metadata displays.

b. Impact: Users with low vision, color blindness, or aging-related vision decline struggle to read content, identify interactive elements, and navigate the interface effectively.

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c. WCAG Success Criteria: 1.4.3 Contrast (Minimum) (AA), 1.4.6 Contrast (Enhanced) (AAA)

3. Missing and Improper ARIA Implementation

a. Dynamic content areas lack proper ARIA roles and state information. Hidden elements marked with aria-hidden contain focusable content, dialog components lack accessible names, and expandable sections don't communicate their expanded/collapsed state to screen readers.

b. Impact: Screen reader users cannot understand the current state of interface elements, resulting in confusion about what actions are available and what the results of their interactions have been.

c. WCAG Success Criteria: 4.1.2 Name, Role, Value (A), 1.3.1 Info and Relationships (A), 4.1.3 Status Messages (AA)

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Disabilities Impacted

Blind and Low-Vision Users

- Issues: Keyboard-inaccessible carousels and slideshows, missing ARIA roles and labels, improper focus management, elements hidden from screen readers but visible on screen, insufficient color contrast, and missing alternative text for informative images.
- Impact: Screen reader users face significant barriers when attempting to browse recommended content, navigate through article collections, and interact with dynamic interface elements. Low-vision users struggle to read text throughout the platform due to insufficient contrast, and critical functionality remains undiscoverable or unusable. The platform's advanced features become largely inaccessible, limiting research capabilities.

Users with Motor Disabilities

- Issues: Keyboard-inaccessible interactive components, inconsistent focus indicators, complex navigation patterns requiring precise mouse control, and elements with inappropriate semantic roles in the focus order.
- Impact: Keyboard-only users cannot access carousel content or interactive browsing features that are essential for discovering research materials. Users who rely on alternative input devices find the platform difficult to navigate efficiently, and some content collections remain completely inaccessible without mouse interaction.

Neurodiverse Users

- Issues: Inconsistent heading structures, ambiguous link text, unlabeled form controls, complex navigation patterns, and poor color contrast affecting readability.
- Impact: Users with cognitive disabilities struggle to develop a clear mental model of the interface due to inconsistent patterns. The lack of clear visual hierarchy and difficult-to-read text creates additional cognitive load, making the platform more challenging to use. Users with attention or focus-related disabilities may become disoriented by the complex interface patterns and insufficient visual feedback.

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Page-Specific Findings and Impact Analysis

The following section lists the accessibility findings by page and WCAG violations and describes their impact on users.

ACM Digital Library Homepage

Issue	WCAG Success Criteria	Description	Example
Keyboard-Inaccessible Content	2.1.1 Keyboard (A)	Multiple carousel and slideshow components cannot be accessed or navigated using keyboard alone. Profile carousels containing author information and content recommendation sliders lack keyboard handlers.	The author profile carousel (owl-stage slideshow) containing 75 items is not keyboard accessible. Users can tab to the component but cannot navigate between slides using arrow keys or other keyboard commands.
ARIA Hidden Elements with Focusable Content	4.1.2 Name, Role, Value (A)	Elements marked with aria-hidden='true' contain focusable child elements, creating confusion for screen reader users when keyboard focus moves to content that screen readers cannot perceive.	Profile links within carousel slides have aria-hidden='true' on parent containers but tabindex='0' on child links, allowing keyboard focus on hidden content.
Improper Focus Order Semantics	2.4.3 Focus Order (A)	Multiple elements in the focus order have roles inappropriate for interactive content. Slideshow containers with role='list' are made focusable but lack proper widget roles for keyboard interaction.	The owl-stage slideshow containers are given tabindex='0' and role='list' but should use proper carousel/slider widget patterns with appropriate keyboard handlers.
Color Contrast Deficiencies	1.4.3 Contrast (Minimum) (AA)	Multiple text elements throughout the homepage fail to meet the minimum contrast ratio of 4.5:1 for normal text, particularly affecting secondary information and metadata displays.	Author names and publication metadata in search results display with insufficient contrast against their backgrounds, making them difficult to read for users with low vision.
Missing ARIA Roles	4.1.2 Name, Role, Value (A)	Interactive slideshow and carousel components lack proper ARIA roles to	Content browsing components are implemented as generic div containers

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Issue	WCAG Success Criteria	Description	Example
		communicate their purpose and functionality to assistive technology users.	with owl-stage classes but missing role='region' or role='group' with appropriate aria-label attributes.

Impact Summary:

The homepage presents significant barriers for keyboard and screen reader users trying to discover content through the platform's recommendation and browsing features. While the main search functionality remains accessible, the inability to access carousel content means that users with disabilities miss out on curated collections, featured authors, and highlighted research. The color contrast issues compound these problems by making even accessible content difficult to read for users with low vision.

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ACM Digital Library Homepage Screenshot

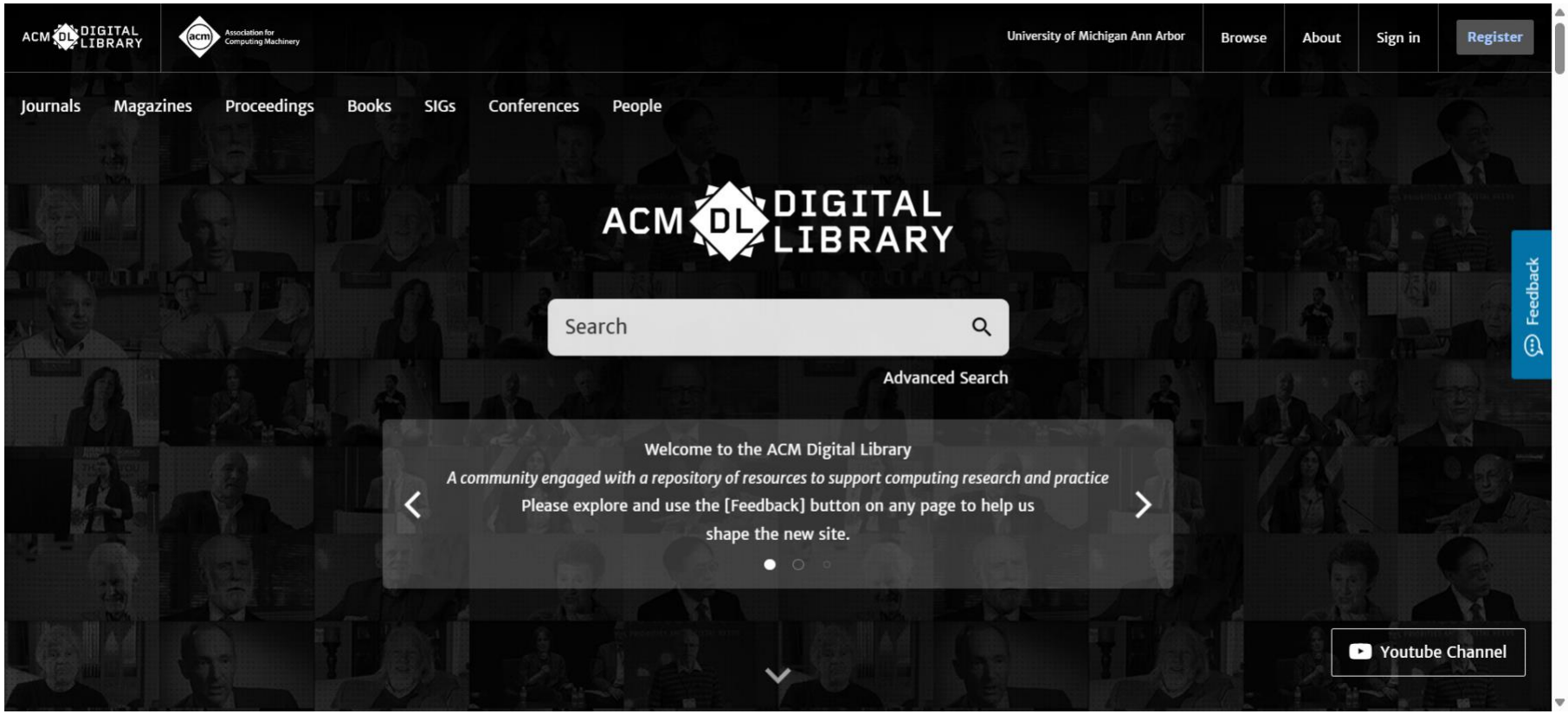

Figure 1.The ACM Digital Library homepage displays the main search interface with navigation menu and rotating welcome carousel. The University of Michigan Ann Arbor institutional access is shown in the top right corner with Browse, About, Sign in, and Register options.

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Search Results Page

Issue	WCAG Success Criteria	Description	Example
Missing Accessible Name for ARIA Commands	4.1.2 Name, Role, Value (A)	Interactive buttons lack accessible names, making them unusable for screen reader users. The 'More' button for additional format options has no programmatic label.	The 'more-button' element with class 'btn--icon' displays 'More' visually but has no aria-label, making it announced only as 'button' by screen readers.
Label-Content Name Mismatch	2.5.3 Label in Name (A)	The visible text of interactive elements does not match their accessible names, causing confusion for voice input users and screen reader users.	The 'Edit Search' link displays 'Edit Search' visually but has aria-label='Click here to edit your search', which doesn't contain the visible text.
Missing Dialog Accessible Name	4.1.2 Name, Role, Value (A)	The slide-out panel for filters lacks an accessible name, preventing screen reader users from understanding the purpose of the dialog when it opens.	The w-slide element with role='dialog' references aria-labelledby='w-slide__title' but this element either doesn't exist or is empty.
Improper Focus Order Semantics	2.4.3 Focus Order (A)	Tooltip elements and citation metric displays are included in the focus order with tabindex='0' but lack proper interactive widget roles.	Multiple tooltip divs containing citation metrics have tabindex='0' but use generic div elements rather than appropriate button or tooltip roles.
Color Contrast Issues	1.4.3 Contrast (Minimum) (AA)	Cookie consent dialog text and various UI elements fail to meet minimum contrast requirements.	The cookie policy text and the 'Saved Searches' link have insufficient contrast against their backgrounds for users with low vision.

Impact Summary:

The search results page contains several critical barriers that affect users' ability to refine searches and access result metadata. The missing labels on interactive controls make essential functionality invisible to screen reader users. Voice input users struggle when the visible text doesn't match the programmatic labels, forcing them to guess what commands might work. The focus order issues create confusion as keyboard users encounter interactive elements that don't behave as expected.

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Search Results Page Screenshot

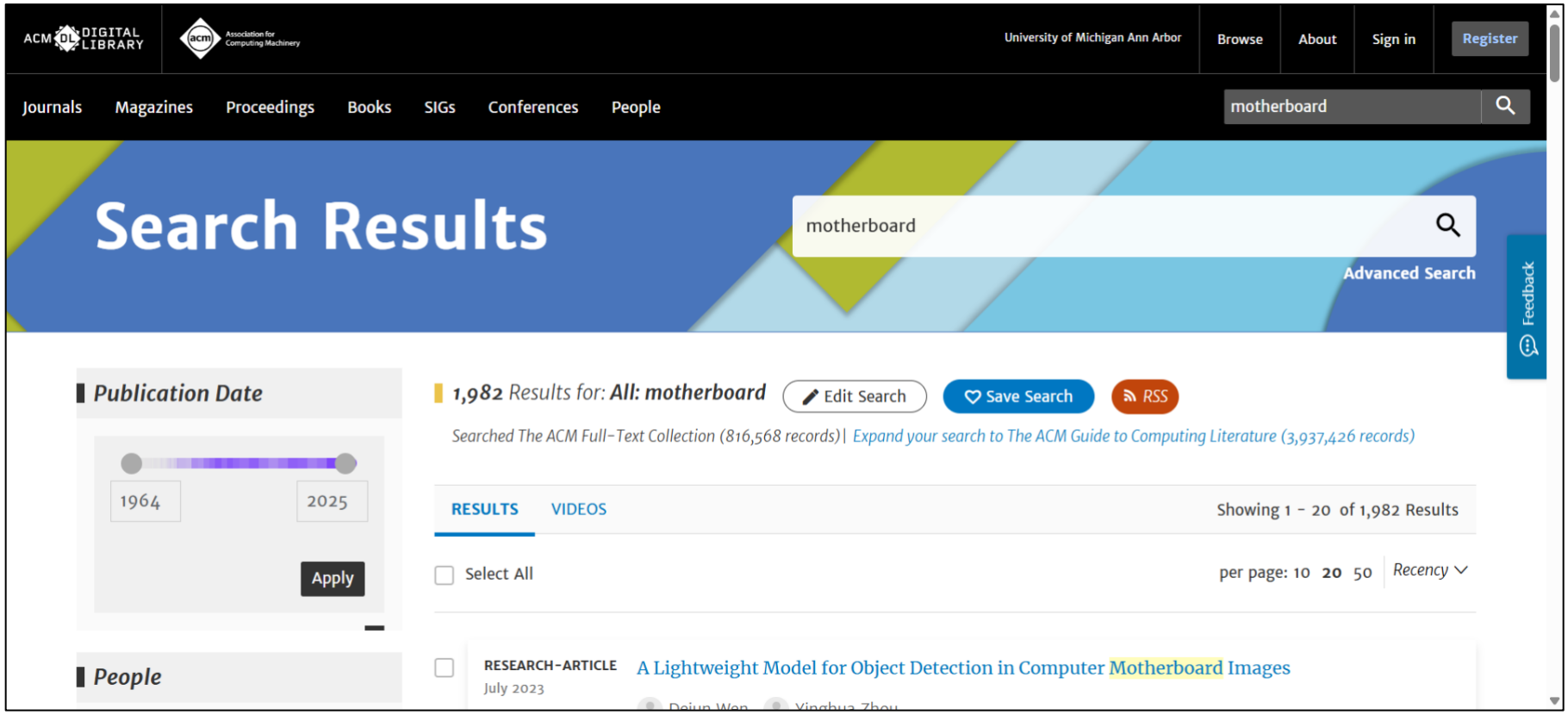

Figure 2. Search results for 'motherboard' display 1,982 matching items with filtering options by publication date and people. The first result is a 2023 research article on object detection in computer motherboard images

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Article View Page

Issue	WCAG Success Criteria	Description	Example
Prohibited ARIA Attributes	4.1.2 Name, Role, Value (A)	Tab panel containers use aria-expanded attribute which is not allowed on elements without appropriate widget roles, preventing proper state communication.	Multiple div elements with IDs like 'core-collateral-info' and 'core-collateral-metrics' have aria-expanded='false' without role='button' or role='tab'.
Extensive Color Contrast Failures	1.4.3 Contrast (Minimum) (AA)	Widespread color contrast issues affect readability throughout the article view, particularly impacting social sharing buttons, discussion areas, and metadata displays.	The Reddit sharing button has insufficient contrast (3.44:1) with white text on orange background. Discussion section displays 'Nothing in this discussion yet' with only 3.87:1 contrast ratio.
Links Difficult to Distinguish	1.4.1 Use of Color (A)	Links within text blocks rely solely on color to distinguish them from surrounding text, making them invisible to users who cannot perceive color differences.	Reference links and inline citations use only color to indicate they are interactive, without underlines or other visual indicators.
Content Not Contained by Landmarks	1.3.1 Info and Relationships (A)	Significant content appears outside of landmark regions, making it difficult for screen reader users to navigate the page structure efficiently.	Article metadata, sharing options, and related content sections are not contained within navigation, main, or complementary landmark regions.
Missing Alternative Text	1.1.1 Non-text Content (A)	Figures, charts, and diagrams within articles lack alternative text descriptions, preventing screen reader users from accessing this visual information.	Article figures showing experimental results, architectural diagrams, and data visualizations are present as images without accompanying alt text or long descriptions.

Impact Summary:

The article view page contains critical accessibility barriers that prevent users with disabilities from effectively consuming academic content. The widespread color contrast issues make reading difficult for users with low vision, while the missing alternative text for figures and diagrams means that screen reader users cannot access key research findings presented visually. The improper ARIA implementation creates confusion about which content sections are available and how to access them.

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Advanced Search Page

Issue	WCAG Success Criteria	Description	Example
Improper Heading Hierarchy	1.3.1 Info and Relationships (A)	Heading levels skip from H2 to H4 without an intervening H3, breaking the logical document structure and making navigation difficult for screen reader users.	The 'Boolean searches' section uses an H4 heading directly after H2 headings, violating proper heading hierarchy.
Non-Unique Landmarks	1.3.1 Info and Relationships (A)	Multiple navigation landmarks exist without unique labels, making it impossible for screen reader users to distinguish between them when navigating by landmarks.	Two nav elements exist on the page without distinguishing aria-label attributes - one in the header and one in the footer.
Content Outside Landmarks	2.4.1 Bypass Blocks (A)	The skip navigation link is not contained within a landmark region, making it difficult for screen reader users to locate and understand its purpose.	The 'skip to main content' link appears outside all landmark regions at the top of the page.
Improper Focus Order Semantics	2.4.3 Focus Order (A)	Footer section headings are made focusable with tabindex='0' but use H2 and H3 elements rather than appropriate interactive widget roles.	Footer headings for 'Categories', 'About', 'Join', and 'Connect' have tabindex='0' but remain as heading elements rather than being converted to button or disclosure patterns.
Color Contrast Issues	1.4.3 Contrast (Minimum) (AA)	Multiple form labels, help text, and navigation links throughout the advanced search interface fail to meet minimum contrast requirements.	The 'Saved Searches' link and various form field labels have insufficient contrast, making them difficult to read for users with low vision.

Impact Summary:

The advanced search page shows strong foundational accessibility with proper form structure but suffers from several structural and visual issues that create barriers for users with disabilities. The improper heading hierarchy makes it difficult for screen reader users to understand the page organization and navigate efficiently. The non-unique landmarks and content outside landmarks create confusion when using landmark navigation. Combined with color contrast issues, these barriers make the advanced search functionality less accessible than it could be.

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Advanced Search Page Screenshot

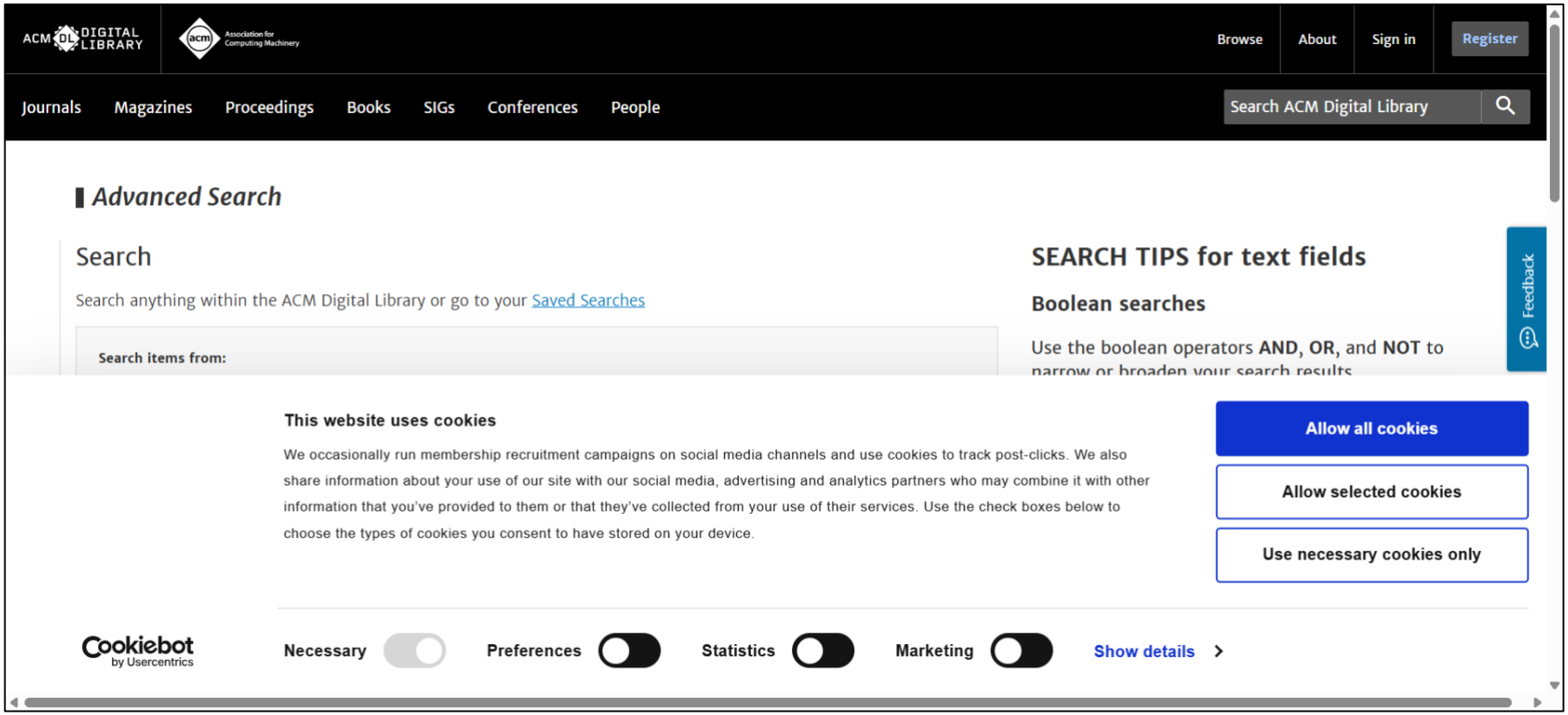

Figure 3. The Advanced Search page provides detailed search options for filtering ACM's computing research collection. Search tips explain Boolean operators (AND, OR, NOT) for refining queries.

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Code Snippets

The following code snippets illustrate current implementations and recommended fixes for critical WCAG success criteria violations.

1. Keyboard-Inaccessible Carousel (2.1.1 Keyboard)

```
<!-- Current problematic implementation -->
<div class="owl-stage" role="list" aria-label="Slideshow" tabindex="0">
  <div class="owl-item" aria-hidden="true">
    <a href="/profile/81100388992" tabindex="0">View Profile</a>
  </div>
</div>

<!-- Recommended fix -->
<div class="carousel" role="region" aria-label="Featured Authors" aria-live="polite">
  <div class="carousel-controls">
    <button aria-label="Previous author" onclick="previousSlide()">
      <span aria-hidden="true">&lt;</span>
    </button>
    <button aria-label="Next author" onclick="nextSlide()">
      <span aria-hidden="true">&gt;</span>
    </button>
  </div>
  <div class="carousel-items" tabindex="0" aria-label="Slide 1 of 75">
    <a href="/profile/81100388992">View A. Seznec Profile</a>
  </div>
</div>
```

2. ARIA Hidden Elements with Focusable Content (4.1.2 Name, Role, Value)

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```
<!-- Current problematic implementation -->
<div class="owl-item" aria-hidden="true">
  <a href="/profile/81100388992" title="View Profile" tabindex="0">
    View Profile
  </a>
</div>

<!-- Recommended fix -->
<div class="carousel-item" aria-hidden="false">
  <a href="/profile/81100388992" aria-label="View A. Seznec profile">
    View Profile
  </a>
</div>
<!-- OR remove from DOM and tab order entirely when hidden: -->
<div class="carousel-item" aria-hidden="true" style="display: none;">
  <a href="/profile/81100388992" tabindex="-1" aria-hidden="true">
    View Profile
  </a>
</div>
```

3. Missing Accessible Names (4.1.2 Name, Role, Value)

```
<!-- Current problematic implementation -->
<span data-title="More" class="btn--icon more-button" role="button">
  <i class="icon-views"></i>
  <span class="visibility-hidden">More</span>
</span>

<!-- Recommended fix -->
<button class="btn--icon more-button" aria-label="More format options">
  <i class="icon-views" aria-hidden="true"></i>
```

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```
  <span class="sr-only">More</span>
</button>
```

4. Insufficient Color Contrast (1.4.3 Contrast)

```
/* Current problematic implementation */
.discussion-empty {
  color: #7f8282;  /* 3.87:1 contrast - FAILS */
  background-color: #ffffff;
}

/* Recommended fix */
.discussion-empty {
  color: #5f6363;  /* 4.54:1 contrast - PASSES */
  background-color: #ffffff;
}
```

5. Label Content Name Mismatch (2.5.3 Label in Name)

```
<!-- Current problematic implementation -->
<a id="search__edit" href="/search/advanced"
   role="button"
   aria-label="Click here to edit your search">
  Edit Search
</a>

<!-- Recommended fix -->
<a id="search__edit" href="/search/advanced"
   role="button"
   aria-label="Edit Search">
  Edit Search
</a>
```

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<!-- Note: aria-label now contains the visible text "Edit Search" -->

Final Thoughts and Recommendations

The ACM Digital Library demonstrates a solid foundation in accessibility with proper semantic HTML structure in many areas, functioning keyboard navigation for core search functionality, and attention to accessibility in its architecture. The platform successfully provides access to a vast collection of computing research, and the basic search and browsing features work well for many users with disabilities.

However, our evaluation identified several significant opportunities for improvement that would substantially enhance the experience for users with disabilities. The most critical barriers involve keyboard-inaccessible carousel and slideshow components, widespread color contrast deficiencies, and inconsistent ARIA implementation for dynamic content. These issues particularly affect blind and low-vision users who rely on screen readers, keyboard-only users with motor disabilities, and users with color vision deficiencies.

The good news is that many of these issues follow predictable patterns, suggesting that systematic remediation efforts could yield significant improvements across the platform. Addressing the interactive component patterns, establishing consistent color contrast standards, and implementing proper ARIA attributes throughout the codebase would create a more inclusive experience for all users.

With the academic community's increasing focus on digital accessibility and inclusive research practices, addressing these concerns positions ACM as a leader in accessible digital publishing. The platform's extensive resources deserve to be fully accessible to researchers and students with disabilities.

Recommended Fixes

- 1. Implement Keyboard Accessibility for Interactive Components
    - Replace third-party carousel plugins (Owl Carousel, Swiper) with accessible alternatives or enhance them with proper keyboard handlers. Ensure all carousels, slideshows, and browsing interfaces support arrow key navigation, have visible focus indicators, and properly manage focus when slides change. Consider implementing the WAI-ARIA Authoring Practices carousel pattern with previous/next buttons and optional automatic rotation with pause controls.
- 2. Remediate Color Contrast Throughout the Platform
    - Conduct a comprehensive color contrast audit and update CSS to meet WCAG 2.2 AA standards (4.5:1 for normal text, 3:1 for large text). Pay particular attention to secondary information, metadata displays, social sharing buttons, link colors, and form field labels. Establish design system guidelines that ensure all new components meet contrast requirements from the start.

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- 3. Fix ARIA Implementation for Dynamic Content
  - Review and correct ARIA attributes throughout the platform. Remove prohibited attributes from elements without appropriate widget roles, add missing accessible names to buttons and dialogs, ensure expandable/collapsible sections properly communicate their state, and verify that aria-hidden elements do not contain focusable content. Consider using automated testing tools to catch ARIA violations during development.
- 4. Improve Document Structure and Landmarks
  - Ensure proper heading hierarchy throughout the platform (no skipped levels), add unique labels to landmark regions, and place all meaningful content within appropriate landmarks. The skip navigation link should be contained within a landmark, and footer navigation should be distinguished from header navigation with unique labels.
- 5. Address Form Accessibility
  - Ensure all form controls have properly associated labels, use native HTML form elements where possible (buttons rather than spans with role='button'), and verify that label text matches visible text for voice input users. Provide clear error messages and instructions, and ensure form validation errors are announced to screen readers.
- 6. Add Alternative Text for Images and Visual Content
  - Develop guidelines for authors submitting articles to include alternative text for all figures, charts, and diagrams. Provide templates and examples showing how to write effective alt text for technical diagrams, experimental results, and data visualizations. Consider implementing a review process that checks for missing alt text before publication.
- 7. Enhance Link Context
  - Ensure links are distinguishable from surrounding text through more than color alone (add underlines or other visual indicators). Make sure link text is descriptive enough to be understood out of context, which helps screen reader users who navigate by links. Avoid generic link text like 'click here' or 'more info'.
- 8. Establish Ongoing Accessibility Testing
  - Integrate automated accessibility testing into the development pipeline using tools like axe-core, Pa11y, or Lighthouse. Conduct regular manual testing with screen readers (JAWS, NVDA, VoiceOver) and keyboard-only navigation. Consider establishing a relationship with users who have disabilities for ongoing usability testing and feedback.

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Disclaimer

Accessiblü prepared this report as a high-level accessibility evaluation of the ACM Digital Library platform. The evaluation utilized industry-standard testing methodologies, including automated testing (Axe DevTools), keyboard-only navigation, and manual inspection for select WCAG 2.2 AA success criteria.

This report does not represent a comprehensive WCAG compliance audit and should not be seen as a certification of accessibility compliance. While we have identified significant accessibility concerns and usability barriers, this evaluation was limited in scope and may not encompass all accessibility issues on the platform.

No Legal Liability:

Accessiblü offers this report for informational purposes only. It assumes no legal responsibility for accessibility violations or compliance failures resulting from its use. Organizations seeking formal certification should conduct a comprehensive audit and user testing with individuals with disabilities.

Limitations of Testing:

This evaluation was conducted at a specific time, and platform updates may have occurred after testing was completed. Additionally, while automated tools and expert reviews were utilized, real-world users with disabilities determine the true measure of accessibility.