

To: Robert Van Rennes, Big Ten Academic Alliance
From: Grey L. Pierce, MSU Usability/Accessibility Research and Consulting
Subject: World Scientific High-Level Accessibility Evaluation for the Library Accessibility Alliance
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MSU Usability/Accessibility Research and Consulting (MSU UARC) conducted a high-level accessibility evaluation of the World Scientific platform to evaluate its conformance with WCAG 2.1 AA Criteria. This evaluation did not include all functionality or content of the site or all WCAG 2.1 AA Success Criteria.

During this evaluation, a number of issues were found that will make the site difficult or impossible to use for many individuals with disabilities.

Critically, some interactive elements interfere with the use of assistive technologies. Users that rely on assistive technologies like screen readers, including individuals with visual and reading impairments, must be able to use those technologies without interference.

Keyboard users, including screen reader users and users with dexterity impairments, will find it impossible to access or use a significant portion of site content. A variety of content throughout the site cannot be reached or operated via keyboard, making it impossible to use for those that rely on keyboard access. Focus order is incorrect in some places, increasing the difficulty of using the site with a keyboard, and most interactive elements lack a sufficiently visible focus indicator, making it difficult for many keyboard-only users to effectively use them, as they cannot determine when they have reached the correct element.

Individuals who rely on screen readers, including many users with visual, reading, and language impairments, will have problems using the site. Significant content is not read out at all or is not read correctly, and structural information (including headings and lists) is not appropriately conveyed to users, making it difficult or impossible to understand content and organization in places. Form inputs are not appropriately labeled, making those inputs difficult or impossible to use for those that rely on screen readers. Custom elements do not correctly announce themselves to screen readers, making them difficult to understand and use. Many images have inappropriate alternative text, significantly impacting users with visual impairments.

The PDF has not been tagged for accessibility and no structural information is provided to assistive technologies, making it extremely difficult to use and navigate for users with disabilities. Additionally, no title or language is provided to assistive technologies.

Other issues were found that will make it difficult for users with a variety of disabilities to effectively use the system, including insufficient color contrast for text and meaningful visual elements, use of color alone to distinguish content, images of text being used instead of styled text, content unexpectedly changing when keyboard focus shifts, inappropriate labels, inappropriate page titles, content being removed when the viewport or text size is changed, and inability to bypass repeated navigation.

To improve access for users with disabilities, MSU UARC recommends a full WCAG 2.1 AA evaluation and that the problems discovered be remediated.

Note: Results for "biped robots" were used as an example of a Search Results page and "ZMP COMPLIANT GAIT GENERATION STRATEGIES FOR SEVEN-MASS BIPED ROBOTS" was used as an example of an Article page.

For reference, screenshots of the Home page (wide, medium, and narrow viewport widths) at the time this evaluation was completed have been included at the end of this memo.

High-Level Findings

Conformance

- On the Search Results page, arrow keys cannot be used to control screen readers when focus is on the tab selector in the Refine Search variant [narrow viewport]. [[WCAG 2.1 CR 4](#)]

Document Structure

- Headings are not appropriately structured throughout the site. [[WCAG 2.1 SC 1.3.1](#)]
 - "Resources", "About Us & Help", and "Links" in page footer should be h2s, not h5s
 - On the Home page, "WHAT'S NEW", "PRESS RELEASES", "NEWS", "NEW REVIEWS", "BESTSELLERS", and "FEATURED ARTICLES" should be h2s, not h3s, and should be organized under an h1
 - On the Home page, article titles in the "FEATURED ARTICLES" section should be h3s, not h5s
 - On the Home page, journal titles in the "FEATURED ARTICLES" section should not be tagged as headings
 - On the Journals page, "Journal Catalogue" and "New Journals" should be h2s, not h1s, and should be organized under a "Journals" h1 that is placed at the start of unique page content (i.e., immediately after main navigation)
 - On the Journals page, "Browse by Subject" should be an h3, not an h4
 - On the Journals page, "LATEST ARTICLES" should be an h2, not an h3
 - On the Journals page, article titles in "LATEST ARTICLES" section should be h3s, not h5s
 - On the Journals page, headings in the YouTube embed are not correctly nested in the page's overall heading structure
 - On the Search Results page, an h1 should be provided at the start of unique page content
 - On the Search Results page, "Narrow Results" should be an h2, not an h3
 - On the Search Results page, headings under "Narrow Results" (e.g., "Publication Type") should be h3s, not h4s
 - On the Search Results page, "Articles/Chapters" should be tagged as a heading (h2)
 - On the Search Results page, article titles (e.g., "DISTAL LEARNING APPLIES TO BIPED ROBOTS") should be h3s, not h4s
 - On the Search Results page, "Filters" and "refine search" should be headings (h1s) when their respective variants are open [narrow viewport]
 - On the Article page, "We recommend" should be an h2, not an h3
 - On the Article page, "Metrics", "History", and "Keywords" in the Details tab should be tagged as headings

- On the Home page, contents of the "WHAT'S NEW" and "NEW REVIEWS" lists should be coded into programmatic lists. [[WCAG 2.1 SC 1.3.1](#)]
- On the Article page, "View Article" shouldn't be coded into a one-item list. [[WCAG 2.1 SC 1.3.1](#)]
- On the Article page, the list under "We recommend" should be coded into a single programmatic list, not two lists. [[WCAG 2.1 SC 1.3.1](#)]
- Main navigation dropdown items are not read out by screen readers. [[WCAG 2.1 SC 1.3.1](#), [WCAG 2.1 SC 1.3.2](#)], [[WCAG 2.1 SC 4.1.2](#)]
- On the Home page, contents of "REFINE SEARCH" section are not read out by screen readers [Firefox only]. [[WCAG 2.1 SC 1.3.1](#), [WCAG 2.1 SC 1.3.2](#)]
- On the Article page, content of all tabs other than "Details" is not read out by screen readers. [[WCAG 2.1 SC 1.3.1](#), [WCAG 2.1 SC 1.3.2](#)]
- PDF is untagged, and provides no structural information or reading order information to assistive technologies. [[WCAG 2.1 SC 1.3.1](#), [WCAG 2.1 SC 1.3.2](#)]
- On the Home page, slideshow items are read out when not visible on screen. [[WCAG 2.1 SC 1.3.2](#)]
- On the Journals page, "Browse by Subject" list ("Asian Studies", "Business & Management", etc.) is read out twice. [[WCAG 2.1 SC 1.3.2](#)]
- On the Search Results page, "Articles/Chapters" and save search and RSS feed icons are incorrectly read out when not visible on screen (they are covered by the page header when initially reached). [[WCAG 2.1 SC 1.3.2](#)]
- On the Search Results page, content covered by the Filters and Refine Search variants is read out when not visible on screen [narrow viewport]. [[WCAG 2.1 SC 1.3.2](#)]
- On the Search Results page, article title headings should be read out before content they organize (e.g., "Chapter", "No Access"). [[WCAG 2.1 SC 1.3.2](#)]
- On the Article page, article title heading (h1) should be read before content it organizes (e.g., journal name, "Full Access"). [[WCAG 2.1 SC 1.3.2](#)]
- On the Article page, "About" is not an appropriate label for the navigation to select Figures, References, Related, and Details content [narrow viewport]. [[WCAG 2.1 SC 2.4.6](#)]
- The language of the PDF is not defined. [[WCAG 2.1 SC 3.1.1](#)]

Keyboard Support

- A variety of interactive content cannot be reached via keyboard. [[WCAG 2.1 SC 2.1.1](#)]
 - On the Home page, keyboard focus cannot be advanced past the title of the second item in the "FEATURED ARTICLES" section [Firefox only]
 - On the Journals page, keyboard focus cannot be advanced past the title of the third item in the "LATEST ARTICLES" section [Firefox only]
 - On the Journals page, cannot reach links in "Browse by Subject" section
 - On the Search Results page, cannot open expanders under "Subjects" (e.g., "Business & Management", "Chemistry")
 - On the Search Results page, cannot reach tabs in "REFINE SEARCH" section (e.g., "Advanced Search", "Search History")
 - On the Search Results page, cannot activate first "+" icon in "Advanced Search" tab of "REFINE SEARCH" section

- On the Article page, cannot reach Google Analytics settings icon
- On the Article page, cannot reach "Cited by: 2" link
- On the Article page, cannot open links in any tab other than "Details"
- Cannot open navigation dropdowns [narrow viewport]
- Focus order is incorrect in multiple locations. [[WCAG 2.1 SC 2.4.3](#)]
 - On the Home page, focus goes to items that are not on-screen in slideshow and "What's New" sections
 - On the Home page, focus shouldn't go to book covers and book titles in the "New Reviews" section separately
 - On the Search Results page, focus incorrectly goes to content covered by the Filters and Refine Search sections when they are open [narrow viewport]
- Focus is not sufficiently visible for most interactive content. [[WCAG 2.1 SC 2.4.7](#)]
 - Main navigation items (e.g., "Subject", "Journals", "Books") and navigation dropdown items (e.g., "All Subjects", "Asian Studies", "Business & Management" under "Subject")
 - On the Home page, all interactive elements, with the exception of "View more" buttons
 - On the Journals page, all interactive elements, with the exception of the YouTube embed and the "Type in here" text input
 - On the Search Results page, all interactive elements, with the exception of the "Advanced Search" link and text inputs
 - On the Search Results page, "Articles/Chapters" and save search and RSS feed icons are not on screen when they receive keyboard focus (they are covered by the page header)
 - On the Article page, all interactive elements
- Main navigation dropdowns open when they receive focus, without the user taking an explicit action or being warned. [[WCAG 2.1 SC 3.2.1](#)]
- On the Search Results page, tabs in the "Refine Search" variant change when arrow keys are used to read them, without the user taking an explicit action or being warned [narrow viewport]. [[WCAG 2.1 SC 3.2.1](#)]
- On the Article page, tabs ("Figures", "References", "Related", and "Details") change when arrow keys are used to read them, without the user taking an explicit action or being warned. [[WCAG 2.1 SC 3.2.1](#)]

Navigation

- Cannot bypass repeated content (no h1 at start of unique page content and "Skip main navigation" link does not occur before the start of repeated navigation). [[WCAG 2.1 SC 2.4.1](#)]
- "Worldscinet " is not an appropriate title for the Journals page. [[WCAG 2.1 SC 2.4.2](#)]
- Search Results and Article page titles do not include site name ("World Scientific"). [[WCAG 2.1 SC 2.4.2](#)]
- The PDF is not titled (correct title is not set in PDF version and is not programmatically set in PDF Plus version). [[WCAG 2.1 SC 2.4.2](#)]

Forms and Data Submission

- On the Journals and Search Results pages, the "Anywhere" dropdown and the text input are not programmatically labeled. [[WCAG 2.1 SC 3.3.2](#)]

Images

- A variety of images have inappropriate or missing alternative text. [[WCAG 2.1 SC 1.1.1](#)]
 - Menu button [narrow viewport]
 - On the Home page, "WordSciNet" and "Exclusive Publisher" images
 - On the Home page, all images in the slideshow
 - On the Home page, book covers in "WHAT'S NEW", "NEW REVIEWS", and "BESTSELLERS" sections (decorative and should have null alt attributes)
 - On the Journals and Search Results pages, search button next to text input
 - On the Journals page, journal covers (decorative and should have null alt attributes)
 - On the Search Results page, "Check out our Bestsellers!" image
 - On the Article page, Google Analytics settings icon
 - On the Article page, opens in new window icons in "We recommend" section
 - On the Article page, "TREND MD" image
 - On the Article page, journal cover in Details tab
- Images in the PDF lack alternative text. [[WCAG 2.1 SC 1.1.1](#)]
- On the Home page, text in slideshow, "WordSciNet" image, "Exclusive Publisher" image, "E-alert", "E-catalogue", "Conference", and "Textbook" are images of text, instead of styled text. [[WCAG 2.1 SC 1.4.5](#)]
- On the Search Results page, "Check out our Bestsellers!" is an image of text, instead of styled text. [[WCAG 2.1 SC 1.4.5](#)]

Color and Visual Characteristics

- On the Journals page, color is the only means to differentiate most links from plain text (e.g., dark blue vs. black). [[WCAG 2.1 SC 1.4.1](#)]
- On the Search Results page, color is the only means to differentiate search term highlighting (grey vs. light grey, grey vs. white). [[WCAG 2.1 SC 1.4.1](#)]
- Black text on dark blue background (e.g., link text in footer on keyboard focus), white text on light grey (e.g., "Play" and "Pause" buttons on Home page), light grey text on white (e.g.; "More >>", author names in "FEATURED ARTICLES" section on Home page; "More >>" and author names in "LATEST ARTICLES" section, "Type in here" on Journals page; "No access" and author names on Search Results page; author names and journal information in "We recommend" section and keywords when focused on Article page), orange text on white (e.g.; section headings on Home page; "Open Access" on Search Results page), dark blue text on dark brown (e.g., "Anywhere" in dropdown on Journals page), and white text on multicolored background (e.g., "As of now, we have over 147..." on Journals page) have insufficient contrast. [[WCAG 2.1 SC 1.4.3](#)]
- White symbols on light grey (e.g., arrows in slideshow and "WHAT'S NEW" section on Home page) and light grey symbols on white (e.g., link opens in new window icons in "We recommend" section, Google Analytics settings icon, and bullets separating keywords on Article page) have insufficient contrast. [[WCAG 2.1 SC 1.4.11](#)]

Custom Elements and Dynamic Content

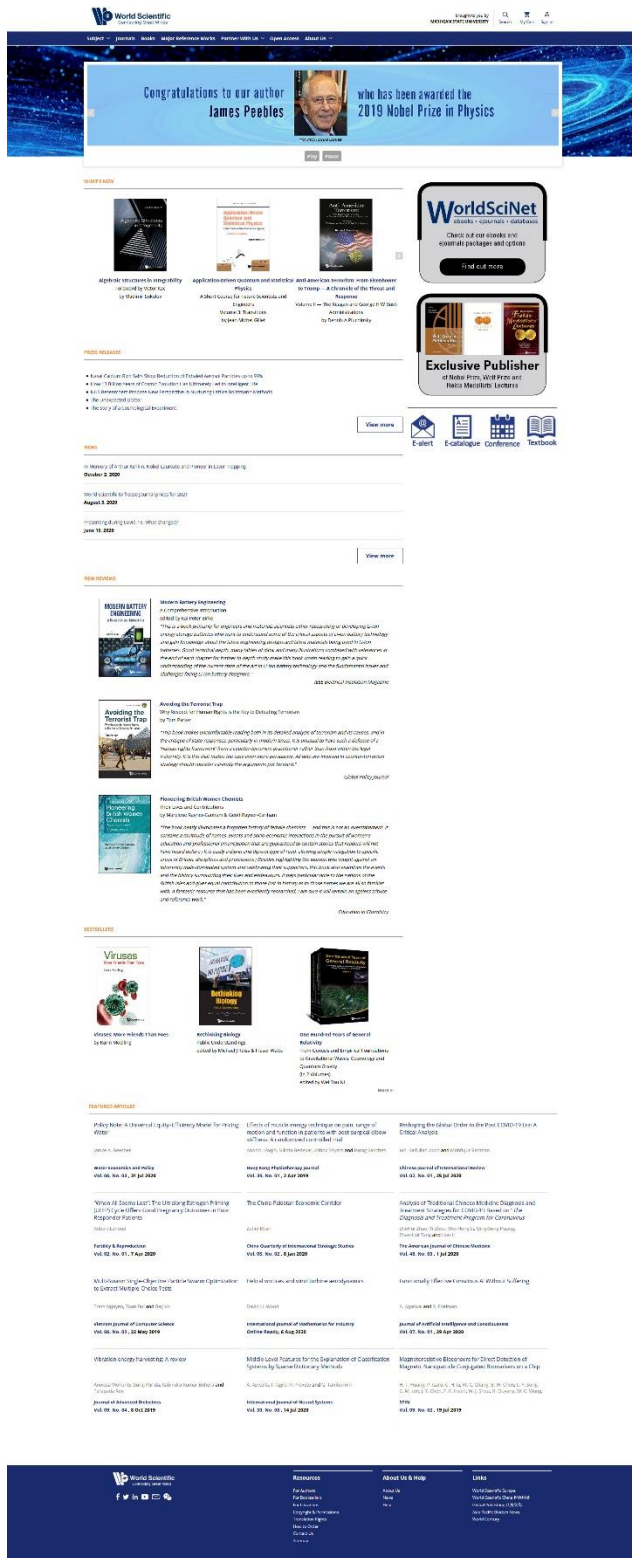
- Footer links disappear at some page widths and text sizes. [[WCAG 2.1 SC 1.4.4](#)]

- Main navigation dropdown items are not read out by screen readers. [[WCAG 2.1 SC 1.3.1](#), [WCAG 2.1 SC 1.3.2](#), [WCAG 2.1 SC 4.1.2](#)]
- Incorrect name and role ("Close Drawer Menu") are provided for button to open menu sidebar [narrow viewport]. [[WCAG 2.1 SC 4.1.2](#)]
- On the Home page, screen reader users are not notified when "Play" and "Pause" buttons are activated. [[WCAG 2.1 SC 4.1.2](#)]
- On the Journals and Search Results pages, an incorrect role ("link") is provided for the "Anywhere" dropdown. [[WCAG 2.1 SC 4.1.2](#)]
- On the Journals and Search Results pages, role (i.e., text input) is not provided for the text input. [[WCAG 2.1 SC 4.1.2](#)]
- On the Search Results page, roles and values (i.e., that they expand and whether they are expanded) are not provided for expanders under "Subjects" or for "REFINE SEARCH". [[WCAG 2.1 SC 4.1.2](#)]
- On the Search Results page, role and value (i.e., that it is a dropdown and whether it is open) are not provided for "SORT" dropdown. [[WCAG 2.1 SC 4.1.2](#)]
- On the Search Results page, names (i.e., "Remove Article") are not provided for buttons to remove filters (they are read out only as "Remove Filter"). [[WCAG 2.1 SC 4.1.2](#)]
- On the Article page, the "Details" tab is always identified to screen readers as the active tab, even when it is not the active tab. [[WCAG 2.1 SC 4.1.2](#)]

Disclaimer: This high-level evaluation was conducted for the Library Accessibility Alliance, and represents a good faith effort conducted within a limited time frame. It should not be assumed to be complete or free from error. No warranties or guarantees are implied. UARC is not responsible for direct, indirect, or incidental damages based on this work; its use or interpretation by any individual, group, or organization; or on conditions beyond our control.

Home Page Screenshots

Large Viewport



Medium Viewport

The screenshot shows the World Scientific website on a medium viewport. The page layout includes a top navigation bar with the company logo and menu items. Below this is a large banner image with text. The main content area is divided into several sections, each featuring a book cover or image and a short text snippet. At the bottom of the page, there is a footer containing social media icons, contact information, and a 'Privacy Policy' link.

Narrow Viewport

