

Website Audit: williamfayers.com

Audit date: 12 May 2026

Generator: Quartz v4.5.2

Hosting: Render, behind Cloudflare CDN

Canonical origin: <https://www.williamfayers.com/> (non-www redirects via 301)

Executive Summary

Kintsugi Zuihitsu is a personal digital garden / Obsidian vault published with Quartz — visually polished and conceptually coherent. The site has 504 content entries and a clean, warm aesthetic. However, it carries two significant self-inflicted performance wounds: Pyodide (a full Python runtime compiled to WebAssembly) is loaded unconditionally on every page, pulling in a ~9 MB .wasm file even when no Python block is present on that page, and all six external scripts load without `defer` or `async`. On the accessibility side, several buttons lack discernible labels, focus outlines are suppressed in CSS, and the hero image has no `alt` text.

Top 3 strengths:

1. Beautiful, distinctive visual design with a warm, coherent theme
2. Dark/light mode toggle, reader mode, keyboard shortcuts, and graph view — strong UX features for a personal site
3. Cloudflare in front of Render provides HTTP/2, edge caching, and DDoS protection at no extra cost

Top 3 critical issues:

1. Pyodide loaded on every page — ~8.97 MB WASM file fetched unconditionally, regardless of whether the page contains a Python code block
2. All scripts are render-blocking — none use `defer` or `async`; 6 external scripts block HTML parsing
3. Broken OG image — <https://www.williamfayers.com/static/og-image.png> returns HTTP 404, so every social share shows no preview image

Product Overview

| Field | Detail |
|-----------|--|
| Site name | Kintsugi Zuihitsu |
| Type | Personal digital garden / public Obsidian vault |
| Generator | Quartz v4.5.2 (static site generator for Obsidian-compatible markdown) |

| Field | Detail |
|---------------|---|
| Content | 504 notes covering maths lectures (MTH3006–MTH3011, tensor analysis, group theory, Fourier analysis), to-do lists, and personal exploration |
| Audience | Primarily self-reference; secondarily anyone interested in maths notes or the author's thinking |
| Hosting | Render (origin) + Cloudflare (edge) |
| URL structure | Non-www → www 301 redirect; content at /clear/clear, /To-Do-List, /attached/remarkable-notes/... |

Performance Audit

Resource Loading

Pyodide (Critical)

The site includes a full in-browser Python runtime ([Pyodide v0.23.4](#)) unconditionally on every page load. This runtime consists of:

- `pyodide.js` — 21 KB loader stub (deceptively small)
- `pyodide.asm.wasm` — 8.97 MB WebAssembly binary, fetched on every page load
- Additional packages: `matplotlib`, `numpy`, `pandas`, `scipy`, `sympy`, `scikit-learn` — loaded at runtime

This is by far the largest performance problem on the site. The WASM file alone exceeds typical page-weight budgets by 5–10×. On a 10 Mbps connection it takes ~7 seconds to transfer; on mobile it is effectively blocking.

Fix: Lazy-load Pyodide only when the page actually contains a Python code block. Check at page-init whether any `.python-run-button` elements exist; if none, skip the `loadPyodide()` call entirely. The existing code already queries `.python-run-button` before enabling buttons — extend that logic to gate the initial load.

```
// Replace unconditional global load with:
if (document.querySelectorAll('.python-run-button').length > 0) {
  loadPyodideGlobal();
}
```

Render-Blocking Scripts (High)

All 6 external scripts are loaded synchronously with neither `defer` nor `async`. This blocks the HTML parser until each script downloads and executes:

| Script | Notes |
|--|--|
| <code>./prescript.js</code> | Quartz SPA init — likely needs to stay synchronous |
| <code>cdnjs.cloudflare.com/.../codemirror.min.js</code> | Can be deferred |
| <code>cdnjs.cloudflare.com/.../codemirror/mode/python/python.min.js</code> | Can be deferred |
| <code>cdn.jsdelivr.net/pyodide/v0.23.4/full/pyodide.js</code> | Can be lazy-loaded (see above) |
| <code>cdn.jsdelivr.net/npm/katex@0.16.11/dist/contrib/copy-tex.min.js</code> | Can be deferred |
| <code>./postscript.js(module)</code> | Already <code>type="module"</code> — modules are deferred by default ✓ |

Fix: Add `defer` to CodeMirror, the Python mode, and KaTeX copy-tex. Confirm `prescript.js` cannot be deferred by testing SPA navigation after doing so.

Inline JavaScript (Medium)

34.2 KB of inline JavaScript is embedded directly in the HTML across 5 `<script>` blocks. This cannot be cached between navigations and increases HTML parse time.

Fix: Extract inline JS to external files so the browser can cache them. Quartz's SPA architecture already serves content via client-side routing, so cached scripts are reused across page transitions.

Google Fonts (Medium)

Three font families are loaded from Google Fonts (Playfair Display, Spectral, IBM Plex Mono) with a `<link rel="preconnect">` hint already in place — good. However there are no `preload` hints for the actual font files, and the `display=swap` parameter is not present in the URL.

Current URL:

```
https://fonts.googleapis.com/css2?family=Playfair+Display:wght@400;700&family=Spectr
```

Actually, `display=swap` is already appended — this is fine. The connection hints are already in place. This is low priority.

Hero Image (Low–Medium)

The single hero image (`./attached/files/chillin-sushi-guy.svg`) loads eagerly with no explicit dimensions set (`width/height` attributes absent). This causes layout shift (CLS) as the browser cannot reserve space before the SVG loads.

Fix:

```

<!-- Add explicit dimensions and lazy loading -->


```

HTTP Headers & Caching

| Header | Status | Detail |
|---------------------------|-----------|---|
| HTTPS | ✓ Pass | Enforced, HTTP/2 via Cloudflare |
| Cache-Control | ⚠ Missing | Cloudflare cf-cache-status: DYNAMIC — responses are not edge-cached; no Cache-Control header returned |
| Strict-Transport-Security | ✗ Missing | HSTS not set |
| X-Frame-Options | ✗ Missing | No clickjacking protection |
| X-Content-Type-Options | ✗ Missing | No MIME-sniffing protection |
| Content-Security-Policy | ✗ Missing | No CSP set |
| Referrer-Policy | ✗ Missing | Not set |
| ETag | ✓ Present | Weak ETag on www origin responses |
| HTTP/2 | ✓ | Via Cloudflare |
| Brotli/gzip | ✓ Likely | vary: Accept-Encoding present (Cloudflare typically applies Brotli) |

Recommended additions (via Cloudflare Transform Rules or Render custom headers):

```

Strict-Transport-Security: max-age=31536000; includeSubDomains
X-Frame-Options: SAMEORIGIN
X-Content-Type-Options: nosniff
Referrer-Policy: strict-origin-when-cross-origin
Cache-Control: public, max-age=3600, stale-while-revalidate=86400

```

Broken Static Assets

| Asset | URL | Status |
|----------|---|----------|
| OG image | https://www.williamfayers.com/static/og-image.png | HTTP 404 |

| Asset | URL | Status |
|-------------------|---|--------------------|
| Favicon | https://www.williamfayers.com/static/icon.png | HTTP 200 ✓ |
| Favicon (non-www) | https://williamfayers.com/static/icon.png | Redirects to www ✓ |

The OG image is referenced in ``<meta property="og:image">`` and ``<meta name="twitter:card">``.

Fix: Upload the missing `og-image.png` to the `static/` directory in the Quartz project and redeploy.

Redirect Chain

<https://williamfayers.com> → 301 → <https://www.williamfayers.com/> (correct, single hop).
The `og:url` on the homepage references <https://williamfayers.com/index> (non-www, with `/index` suffix) rather than the canonical <https://www.williamfayers.com/>. This is a minor inconsistency.

Preload Hints

Zero `<link rel="preload">` tags are present. The LCP (Largest Contentful Paint) element is likely the hero SVG, which could benefit from an early preload hint.

```
<link rel="preload" href="/attached/files/chillin-sushi-guy.svg" as="image" />
```

Performance Summary Table

| Issue | Severity | Effort to Fix |
|---|----------|---------------|
| Pyodide loaded on every page (~9 MB WASM) | Critical | Low-Medium |
| 5 render-blocking scripts (no defer/async) | High | Low |
| Broken OG image (404) | High | Low |
| Missing security headers | High | Low |
| 34 KB inline JS (not cacheable) | Medium | Medium |
| No preload hints for LCP asset | Medium | Low |
| Hero image missing explicit dimensions (CLS) | Medium | Low |
| <code>og:url</code> references non-canonical non-www origin | Low | Low |

Accessibility Audit (WCAG 2.1 AA)

Lang Attribute ✓

`<html lang="en" dir="ltr">` — correctly set. Pass.

Heading Hierarchy (High)

The heading order is broken. On the homepage the document contains:

```
h2 "Kintsugi Zuihitsu" (sidebar site title)
h4 "Reading Settings" (reader panel – skips h3)
h2 "Explorer" (sidebar nav)
h1 "index" (article title – h1 appears after h2s)
h1 "Kintsugi Zuihitsu" (article heading – duplicate h1)
h2 "Keyboard Shortcuts" (modal)
h3 "Navigation"
h3 "Actions"
h3 "Graph View" (sidebar)
```

Problems:

- The document has **two <h1> elements**: the article title `index` and the in-article heading `Kintsugi Zuihitsu`
- The page title `h1` appears in DOM order after multiple `h2` elements in the sidebar
- A `h4` ("Reading Settings") appears without any preceding `h3`, skipping a level

Fix: Restructure the sidebar title as `<p class="site-title">` or `<div>` rather

Missing alt Text (High)

The only `` element on the homepage — the hero SVG — has no `alt` attribute:

```

```

Screen readers will either announce the filename or skip it entirely. As a decorative image, it should at minimum have `alt=""`. If it conveys meaning (the kintsugi/zuihitsu philosophy), it should have a descriptive alt.

Fix:

```
<!-- Decorative: -->


<!-- Or descriptive: -->

```

Buttons Without Accessible Labels (High)

Several buttons have no `aria-label` and no visible text content that screen readers can use:

| Button | Visible text | aria-label | Issue |
|---|--|------------|--|
| Search button | "SearchSearch" (duplicated via SVG title +<p>) | None | SVG <title>Search</title> may work but relying on SVG title is fragile |
| Explorer toggle (mobile) | None | None | Icon-only, no label |
| Explorer toggle (desktop) | "Explorer" | None | Text present ✓ |
| Font size slider | None | None | Range input with no label |
| Line width slider | None | None | Range input with no label |
| Background buttons ("Default", "Sepia", "Warm") | Text present | None | Likely acceptable |
| Empty folder expand button | None | None | Icon-only arrow |

Fix: Add `aria-label` to all icon-only controls:

```
<button type="button" class="explorer-toggle mobile-explorer" aria-label="Open exp...
<input type="range" class="reader-slider" data-setting="fontSize" aria-label="Font ...
<input type="range" class="reader-slider" data-setting="lineWidth" aria-label="Line
```

Focus Indicator Suppressed (High)

The CSS contains `outline: 0 on .expand-button: focus:`

```
.expand-button: focus {
  outline: 0;
}
```

This removes the visible focus ring from the code block expand buttons, making keyboard navigation impossible to track for those elements. WCAG 2.1 SC 2.4.7 (Focus Visible) requires visible focus indicators.

Fix: Replace with a custom focus style rather than removing focus entirely:

```
.expand-button: focus {
  outline: 2px solid var(--secondary);
  outline-offset: 2px;
}
```

Skip Navigation Link (Medium)

No skip-to-main-content link is present. Users navigating by keyboard or screen reader must tab through the entire sidebar (search, dark mode toggle, reader mode, print button, explorer menu) before reaching the article content on every page load.

Fix: Add as the first element in `<body>`:

```
<a href="#quartz-article-content" class="skip-link">Skip to main content</a>
```

With accompanying CSS:

```
.skip-link {
  position: absolute;
  top: -40px;
  left: 0;
  background: var(--secondary);
  color: white;
  padding: 8px;
  z-index: 100;
  transition: top 0.2s;
}
.skip-link:focus {
  top: 0;
}
```

ARIA Roles (Low)

- `role="anchor"` on heading anchor links is not a valid ARIA role — anchor links should use `role="link"` or no role (they are already `<a>` elements). This is a Quartz default; raise it upstream.
- `role="progressbar"` on the reading progress bar lacks `aria-valuenow`, `aria-valuemin`, and `aria-valuemax` attributes — these are required for the role to be meaningful to AT.

Fix for progress bar:

```
<div class="progress-bar"
  role="progressbar"
  aria-label="Reading progress"
  aria-valuenow="0"
  aria-valuemin="0"
  aria-valuemax="100">
</div>
```

Update `aria-valuenow` via JS as scroll position changes.

Colour Contrast (Unverified — Medium)

The warm tan/cream background (`--light`) against the muted teal/green text (`--secondary`) used for the site title and links warrants contrast-ratio verification. From the screenshot, the palette is low-contrast by design (aesthetic choice). WCAG AA requires 4.5:1 for normal text and 3:1 for large text.

The green teal used for "KintsugiZuihitsu" headings against the warm tan background should be checked. Based on visual inspection this is likely borderline — around 3–4:1.

Fix: Use a tool such as [WebAIM Contrast Checker](#) with the exact hex values from `index.css` to verify, and darken the foreground colour if below threshold.

`<title>` Equals "index" (Low)

The page `<title>` is literally `index` — the internal Quartz slug for the homepage. Screen reader users and browser tab users see "index" as the document title. This should read something meaningful like "KintsugiZuihitsu" or "William Fayers — KintsugiZuihitsu".

Fix: In Quartz configuration, override the homepage title.

No `robots.txt` (Low)

Fetching `/robots.txt` (on both non-www and www) returns the 404 HTML page. No robots directive file exists, so crawlers use their default behaviour. This is acceptable for a personal site but is worth noting.

Accessibility Summary Table

| Issue | WCAG Criterion | Severity | Effort |
|--|------------------------------|----------|------------|
| Hero image missing <code>alt</code> attribute | 1.1.1 Non-text Content | High | Low |
| Broken heading hierarchy (two <code>h1</code> s, skipped levels) | 1.3.1 Info and Relationships | High | Medium |
| Icon-only buttons without labels | 4.1.2 Name, Role, Value | High | Low |
| Range inputs without labels | 1.3.1/ 4.1.2 | High | Low |
| Focus outline suppressed on <code>.expand-button</code> | 2.4.7 Focus Visible | High | Low |
| No skip navigation link | 2.4.1 Bypass Blocks | Medium | Low |
| <code>progressbar</code> missing required ARIA attributes | 4.1.2 Name, Role, Value | Medium | Low |
| Invalid <code>role="anchor"</code> | 4.1.2 Name, Role, Value | Low | Low |
| Colour contrast — muted teal on tan (unverified) | 1.4.3 Contrast (Minimum) | Medium | Low–Medium |
| Page <code><title></code> is "index" | 2.4.2 Page Titled | Low | Low |

Priority Action Items

Ranked by Severity × Effort (highest priority first):

| # | Action Item | Category | Severity | Effort | Priority |
|----|--|---------------|----------|--------|----------|
| 1 | Lazy-load Pyodide only on pages with Python blocks | Performance | Critical | Low | P0 |
| 2 | Upload missing og-image.png to static directory | Performance | High | Low | P0 |
| 3 | Add alt attribute to hero SVG image | Accessibility | High | Low | P0 |
| 4 | Add aria-label to icon-only buttons and range inputs | Accessibility | High | Low | P0 |
| 5 | Fix outline: 0 focus suppression on expand button | Accessibility | High | Low | P0 |
| 6 | Add defer to CodeMirror, Python mode, KaTeX scripts | Performance | High | Low | P1 |
| 7 | Add security headers (HSTS, X-Frame, X-Content-Type, etc.) | Performance | High | Low | P1 |
| 8 | Fix heading hierarchy — remove duplicate h1, fix sidebar h2s | Accessibility | High | Medium | P1 |
| 9 | Add skip-to-main-content link | Accessibility | Medium | Low | P1 |
| 10 | Add aria-valuenow/min/max to progress bar | Accessibility | Medium | Low | P2 |
| 11 | Add explicit width/height to hero SVG (reduce CLS) | Performance | Medium | Low | P2 |
| 12 | Add <link rel="preload"> for LCP hero image | Performance | Medium | Low | P2 |
| 13 | Verify and fix colour contrast ratios | Accessibility | Medium | Medium | P2 |
| 14 | Extract 34 KB inline JS to cacheable external files | Performance | Medium | Medium | P3 |
| 15 | Fix og:url to use www canonical | Performance | Low | Low | P3 |
| 16 | Fix page<title> from "index" to meaningful name | Accessibility | Low | Low | P3 |
| 17 | Fix invalid role="anchor" (Quartzupstream issue) | Accessibility | Low | Medium | P3 |
| 18 | Add robots.txt | Performance | Low | Low | P4 |

Conclusion

The site's biggest problem is architectural: Pyodide's 9 MB WASM runtime loads unconditionally on a site where the vast majority of pages have no Python blocks. This single change (lazy-loading Pyodide) would eliminate the most significant performance bottleneck. The second-most impactful immediate fix is uploading the missing OG image — zero effort, and it fixes social sharing across all 504 pages instantly.

On accessibility, the issues are largely Quartz defaults rather than bespoke mistakes: the heading hierarchy, missing alt text, and unlabelled controls are all patterns that upstream Quartz doesn't address by default. Most are fixable with targeted HTML/CSS overrides in the Quartz custom components directory.

Key themes:

- Performance suffers primarily from unconditional heavy third-party loading (Pyodide, CodeMirror on pages that may not need them)
- Accessibility gaps are mostly labelling omissions — low effort to fix, high impact for AT users
- Security headers are entirely absent and straightforward to add via Cloudflare Transform Rules

Suggested next steps:

1. Gate Pyodide behind `.python-run-button` detection (30 min code change)
2. Upload `og-image.png` and `robots.txt` (5 min)
3. Add `defer` to non-critical scripts (10 min)
4. Add security headers in Cloudflare dashboard (15 min)
5. Batch-fix the accessibility issues in Quartz custom component overrides

Audit performed 12 May 2026. Sources: direct HTTP inspection of <https://williamfayers.com>, HTML analysis, response header inspection, [Pyodide documentation](#), [WCAG 2.1 guidelines](#), [Quartz v4 docs](#).