Alexa Melvin Portfolio

Overview

In this document, you'll find detailed explanations of major professional work of mine, code samples and repository, visual samples, as well as demo web apps and websites to see my skills.

React/JavaScript

Spotify Sync

A helpful tool for managing your Spotify music library

Objective

Spotify keeps albums and songs separate in a user's music library. Create a web application to sync user's saved albums and liked songs, focusing on performance, user experience, and efficiency.

Tech Stack & Links

- **Built With**: React, Typescript, Zustand, React Query, Node.js, Spotify REST API, Material UI
- **Demo**: Spotify Sync
- **Repository**: Spotify Sync Code

Challenges & Solutions

- **Rate Limiting**: Implemented a token bucket algorithm to manage API request rates for Spotify, essential for large sync requests.
- **Data Persistence**: Utilized IndexDB for client-side data storage, enhancing user experience by preserving user state in case of refresh.
- **Efficient Searching**: Employed a TrieSearch data structure for an optimized album dictionary, improving render speeds by 20%.

Components, Hooks, and other Code Samples

- **AlbumSelector (React component)**:
  - [Code link.](#)
  - Grid of selectable album cards with filtering options.
  - Practices memoization based on selection filtering/sorting inputs.
  - Hydrates from a global management store that is saved in indexDB.
- **useSavedAlbumsQuery (React Hook):**
  - [Code link.](#)
  - Wrapper of react query "useQuery hook".
  - Retrieves user's saved albums and then sorting/filtering the data. Caches based on filter setting, displayed album amount, and search query.
- **getSavedAlbums (Data Fetch Function):**
  - [Code link.](#)
  - The function iterates over a dynamic amount of potential API calls to Spotify to ultimately retrieve all of the user's saved albums.

- ○ Each API request is made with our "SpotifyAPI" class' "makeRequest" function, which uses a token bucket algorithm due to rate limits in the Spotify API publicly available.
- ○ In the request function, we process an album dictionary with a TrieSearch data structure, providing more efficient retrievals. Our data can be significant in size, and searches could be requested up to 6 times a second as our front end dispatches the query on input change, not form submission.
- ○ We debounce inputs, but we also want to achieve an almost instantaneous feel on searching. This optimized dictionary (compared to JS array functions) leads to **an average of 20% faster render speeds** for the "Album Selector" component.
- **AlbumCard** (React Component)
  - ○ [Code link.](#)
  - ○ While the project relies upon the Material UI component library system, here I made add more UI styles to reflect when a user selected an album.
  - ○ Using the "fast-average-color" module for efficient image analysis to retrieve the image's average pixel color, we use the asynchronous getter function and wrap that within a useQuery hook. That way we can cache the image average color value as long as the album id and image url are stable. While we are waiting for the average color value, we set the card opacity to 0. Then when the color is available, we transition to full opacity,
  - ○ Note that the styles are defined in a components "sx" prop, which is like the React "style" prop but with much more power. For example, we provide a callback to the sx prop with our MUI defined "theme" as the callback parameter. The theme is passed by a context provider containing our custom theme at our App's root component.

Performance Metrics

- Achieved almost instantaneous search feedback, despite multiple API calls, thanks to TrieSearch and token bucket algorithms.
- 20% faster render speeds in the Album Selector component, as measured by React's Profiler API.

Takeaway

The Spotify Sync project displays my capabilities in tackling performance, scalability, and UX design challenges. Though still a work-in-progress, it already demonstrates thoughtful solutions to real-world problems.

Document Uploader for Amica Insurance

A User-Centric Solution

Objective

Revamp the document uploader on Amica Insurance's customer portal to enhance user experience, performance, and accessibility.

Context and Role

- I was the main developer in a larger customer document overhaul project for Amica Insurance.
- Onboarded a new UX designer after the original designer left mid-project.

Design Evolution

- Collaborated with UX designers, taking an active role in user experience discussions.
- Proposed and implemented slight design tweaks, focused on:
    - Enabling users to tag each document for better categorization.
    - Allowing users to flag medically sensitive documents for special handling.

Technical Highlights

- **Tech Stack**: Utilized React Context with "useReducer" hook to manage uploader flow state, including file selections and descriptions.
- **Component Design**: Built new and refactored existing components to follow the Single Responsibility Principle.
- **Concurrency and Performance**: Used JS promise concurrency to upload multiple files concurrently, ensuring accurate response data for each file.
- **Accessibility**: Made additional efforts for better upload accessibility, particularly in the complex file select/drop zone component.
- **UX Enhancements**: Added CSS transitions to improve user experience during file selection and removal.
- **Testing**: Crafted Jest unit tests to cover each step of the upload flow.

Impact and Value

- **Project Timeline**: Reduced a potential delay of over a month to just 2 weeks, helping to meet MVP goals.
- **User Adoption**: Achieved a 150% increase in successful uploads in the 6 months post-release.
- **Customer Experience**: Simplified and expedited the document uploading process, particularly crucial during the stressful moments surrounding insurance claims.

Takeaway

Successfully navigated team changes and design challenges to deliver a user-friendly, efficient, and accessible document uploader, positively impacting both the development timeline and customer satisfaction.

WordPress

Providence College Library Website

Objective

Overhaul the Library Website for better user experience for students, staff, and faculty. Ensure college brand standards are met. Emphasis the librarians who make the library flourish in digital and physical spaces.

Context and Role

- I have been the main website content management.
- Utilizing the WordPress Gutenberg editor and following the brand standard established in the theme and CSS code.

Page Samples

On the following pages are screenshots on some new redesigned pages.

PROVIDENCE
COLLEGE

HOME   ABOUT ⌄   **SERVICES ⌄**   RESOURCES ⌄   ARCHIVES ⌄   MY ACCOUNT

🏠 Services

Borrow an Item

Borrow Tech Equipment

Research Support

Media Support

Visitors

Contact Us

Contact Us

Circulation Desk: (401) 865-1993
Text a Librarian: (401) 200-3894
askalibrarian@providence.libanswers.com

Social Media

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Quick Links

- New York Times & Wall Street Journal Subscription
- Current Providence Journal Issues
- Academic Integrity & Copyright
- Request an Interlibrary Loan
- Printing
- Faculty Request Purchase or Delivery
- Remote Teaching, Learning, & Research Support

Services

Need Help?
Check out the services we provide at the library below.

CATEGORIES:

- Borrow an Item
- Need Help on your Assignment?
- Media Support
- Services for Faculty
- Course Materials
- Classroom Instruction

Borrow an Item

Borrow an item from the Library ⧉
Learn about borrowing items like books from our library collection.

Borrow an item that's not at PC ⧉
Learn about ways to borrow items that are not in our collection.

Borrow Tech Equipment ⧉
Learn about tech equipment you can borrow from our collection.

🏠 Services

▸ Borrow an Item

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Social Media

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- Current Providence Journal Issues
- Academic Integrity & Copyright
- Request an Interlibrary Loan
- Printing
- Faculty Request Purchase or Delivery
- Remote Teaching, Learning, & Research Support

Borrow

Borrow at the library

Here are the policies to know when borrowing at the library:

Students

- **Load period:** 1 month
- **Item Limit:** 50 items
- **Requirements:** PC ID or photo ID & proof of admission

Faculty & Staff

- **Load period:** 4 months
- **Item Limit:** 100 items
- **Requirements:** PC ID or photo ID

Alumni

- **Load period:** 1 month
- **Item Limit:** 20 items
- **Requirements:** PC degree holder

HELIN Members

- **Load period:** 4 months
- **Item Limit:** 30 items
- **Requirements:** HELIN member ID

View more borrowing policies   ⌄

Borrow an item not at PC

You have options even if an item is not available at our library.

Borrow from a local partner library

You can borrow items from local partner libraries in the HELIN library network. You get access to many more resources, like books and *, shared in the HELIN library network.

How to borrow from a HELIN library:

1. Request an item through our library's online catalog. Make sure to search select "HELIN Libraries" in your search when requesting in the online catalog.

2. HELIN items usually arrive within 2-3 business days and an email notification will be sent when they are ready to be picked up.

3. The loan period for HELIN items is 30 days.

4. You can renew your items online through "My Account" on the library homepage or by contacting the circulation desk:

Contact Us
Circulation Desk: (401) 865-1993
Text a Librarian: (401) 200-3894
✉ askalibrarian@providence.libanswers.com

Here is a list of the HELIN libraries and their locations:

As a Providence College student, staff, or faculty member, you have access to 7 different local libraries in the network:

Bryant University	⌄
Community College of Rhode Island (CCRI)	⌄
Johnson & Wales University	⌄
Rhode Island College	⌄
Roger Williams University	⌄
Salve Regina University	⌄
Wheaton College	⌄

Request an item to be loaned to PC

Students, staff, and faculty can request an item to be loaned from another library through a process called "Interlibrary loan". You get access to many more items through interlibary loan.

What items can I request through Interlibary Loan?

Available
- ✅ Physical Books
- ✅ Book Chapter Excerpts
- ✅ Journal Articles
- ✅ Audiobooks on CD
- ✅ Films on DVD
- ✅ Microfilm

Not Available
- ❌ E-Books
- ❌ Streaming Audiobooks
- ❌ Streaming Films

How to borrow from through an Interlibrary Loan:

1. Request an item through our library's online catalog. Make sure to search select "HELIN Libraries" in your search when requesting in the online catalog.

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![Providence College logo] PROVIDENCE COLLEGE

HOME   ABOUT ⌄   SERVICES ⌄   RESOURCES ⌄   ARCHIVES ⌄   MY ACCOUNT

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▸ **Borrow Tech Equipment**

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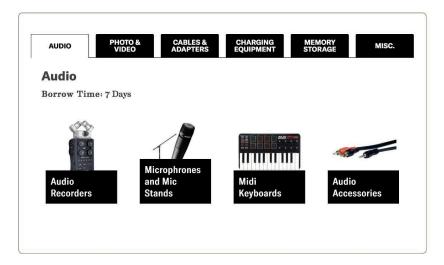- Remote Teaching, Learning, & Research Support

Borrow Tech Equipment

Our Tech Catalogue

| SEARCH AVAILABILITY OF EQUIPMENT → | TECH EQUIPMENT BORROWING AGREEMENT → |

What to Know:

- Available to students, faculty and staff for short-term use.
- First-come, first-served basis with priority given to students.
- The library is unable accommodate laptop requests for remote/hybrid work.
- Faculty and staff that require a laptop for long-term use may reach out to their department head or the IT department to explore their options.

Find an Item to Borrow

| **AUDIO** | PHOTO & VIDEO | CABLES & ADAPTERS | CHARGING EQUIPMENT | MEMORY STORAGE | MISC. |

Audio

Borrow Time: 7 Days

 Audio Recorders

 Microphrones and Mic Stands

 Midi Keyboards

 Audio Accessories

Dorr Rebellion Project Website

Objective

Improve the design of the site by customizing the GeneratePress theme. Migrate site within larger multisite from on-prem server to cloud hosting provider.

Context and Role

- I have been the main WordPress developer and maintainer.
- Played a critical role in migration to cloud hosting provider.

Page Samples

On the following pages are screenshots of the website.

Home

The Thomas Wilson Dorr Rebellion of 1841-43 is considered the most significant constitutional and political event to occur in Rhode Island history. This educational website, developed through a collaboration of Providence College's Digital Projects & Metadata team (Phillips Memorial Library), faculty and community scholars, provides an introduction to the topic through a short-form documentary, image gallery, local constitutions, correspondence (to and from Thomas Wilson Dorr), supporting curricular materials and links to regional Thomas Wilson Dorr resources.

The Dorr Rebellion

[Transcript]

Page Menu

- About
- Articles
  - Thomas Wilson Dorr and the Politics of Slavery
- Constitutions
  - The Law & Order Constitution
  - The People's Constitution
- Gallery
- Home
- Lesson Plans
- Resources
- Video

The Dorr Rebellion project is the resulting collaboration of the Phillips Memorial Library (Providence College), Dr. Erik Chaput and Mr. Russell DeSimone.

Search the project:

Search for...   🔍

Featured Article:

Thomas Wilson Dorr and the Politics of Slavery

Learn more about Dorr's career in the Rhode Island legislature and his battle against the pro-slavery "gag rule".

Awards and Reviews:

RHODE ISLAND HUMANITIES

Winner of 2022 Public Humanities Scholar Award from The Rhode Island Council for the Humanities

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COMMON⬤PLACE
the journal of early American life

"The site provides a wealth of primary source documents, images, a well-conceived documentary film, interpretive essays, lesson plans, a bibliography, and links to additional materials"

- Commonplace: the journal of early American life