

# Zixiang(Zack) Hu

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## EXPERIENCE

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### Frontend Software Engineer

Vancouver, Feb. 2025 – Sep. 2025

*D3 Security*

*React, TypeScript, Next.js*

- Modernized legacy .NET 4.8/ASPX web and mobile applications by architecting Next.js **PWA** solution within 5 months, delivering rapid release praised by **Disney** and **Intuit** as "most impressive product in 20 years".
- Optimized React performance by leveraging **Profiler** to identify **render bottlenecks** and implementing strategic **memoization techniques** (React.memo, useCallback) to eliminate unnecessary re-renders.
- Refactored complex state management by migrating from React Context to **Zustand**, eliminating prop drilling and reducing component re-renders by 45%, while improving developer experience with simplified state updates and better TypeScript integration.
- Optimized PWA offline experience using **Servist** by implementing precaching strategies for pages and data, local cache fallbacks for offline requests, and background sync to execute queued requests once connectivity is restored.
- Upgraded **Ant Design Plot** from v1.4.7 to v2.2.2, enabling support for more complex chart visualizations.
- Implemented **SAML SSO** integration with Okta for **enterprise authentication**.
- Enhanced UI with **Framer Motion animations**, with instant response times and 25% faster load times.

### Frontend Software Engineer

Vancouver, Apr. 2024 – Jan. 2025

*Stealth Mode AI startup*

*TypeScript, React, Node.js, Express*

- Enhanced application performance by implementing **React Suspense** and **lazy loading** with custom fallback components, resulting in a 30% reduction in **initial load time**.
- Designed and implemented a hybrid state management system using **Redux** and **Context API**.
- Created **reusable React custom hooks** (useDebounce, useLocalStorage) to standardize **state management** and optimize performance, resulting in 70% reduction in API calls and seamless data persistence across components.
- Implemented **Dependency Injection (DI)** and **Pub/Sub design patterns** to improve system architecture, resulting in enhanced code testability, maintainability and real-time event handling capabilities.
- Built a secure authentication system leveraging **OAuth 2.0** on the backend with **Node.js** and **Express.js**.
- DevOpsed with **Nginx**, **Docker**, **Jenkins**, **Shell** at **AWS EC2**, **RDS**, and **SES**, Tested with **Jest** in **CI/CD**

### Machine Learning Engineer

Vancouver, July. 2024 – Aug. 2024

*Instage*

*Python, Hugging Face, Whisper*

- Replaced the **Microsoft Azure Speech API** with a customized processing pipeline using **Whisper**, reducing **inference time by 31%** and **cutting per-query costs by 20%**.
- Researched and analyzed various speech-to-animation models, extensively documenting findings. Conducted a thorough feasibility analysis, detailing **inference latency** and **GPU resource consumption**.

### Research Assistant

Vancouver, Apr. 2024 – Dec. 2024

*Northeastern University & UBC*

*TypeScript, Three.js, React, Next.js, Phaser.js*

- Developed an interactive 3D game using **Three.js**, **React** and **NextJs** to visualize complex algorithms such as Dijkstra and Bellman-Ford, enhanced user engagement and learning efficiency through gamification.
- Innovatively utilized the **Callback Ref pattern** to solve complex component communication challenges, enabling efficient function sharing between components, reducing render cycles by 40%.
- Integrated **Browser Fingerprinting** technology for **passwordless authentication**, reducing friction in user experience while maintaining robust security measures and detecting suspicious login patterns.
- Integrated **front-end tracking** to monitor user interactions within the 3D game, including user navigation, algorithm choices, and game performance, leveraging tools like **Google Analytics** and custom event tracking to gather insights for improving **user engagement**.

## EDUCATION

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### Northeastern University

*Master of Science in Computer Science (GPA 4.0)*

Vancouver, Canada

*Sep. 2023 – Dec. 2024*

### University of Nottingham

*BSc (Hons) Computer Science with Artificial Intelligence (GPA 3.91 / 4.0, ranked 2nd)*

Nottingham, UK

*Sep. 2019 – Jul. 2023*