

JACOB BEARD

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Full-stack web developer and software engineer, working at all layers of the tech stack, including front-end, back-end, databases, and cloud infrastructure. Extremely versatile, with a broad range of skills. Recent work for Morgan Stanley includes development of an internal version of Google Analytics, integration of an ML classifier model, and data analysis using Pandas and Jupyter notebook.

I am passionate about programming language research: compilers, visual languages, domain-specific languages, esoteric languages, and languages built for legacy systems. I once wrote a compiler in XSLT. My open source project, SCION, is a compiler for the SCXML/Statecharts modeling language and has been used to build several successful commercial enterprise products.

Work Experience

Morgan Stanley (Consultant)

Jan 2019 – present

Incubated and launched many greenfield internal business applications for Structured Products Group (SPG) within the Fixed Income Division (**FID**), including:

- Built an internal web application similar to Google Analytics - collected application usage data, provided dashboards and analytics. Integrated: **Splunk, PostgreSQL, ElasticSearch, DB2, KDB, CSV, Excel**, and **Sybase**. Implemented in **Java, Spring, TypeScript, Angular**, and **Python**
- Built custom **ETL** to extract structured data from vendor PDF invoices, then used **NLP** to enrich the data by matching natural language descriptions against data contained in internal databases. Generated Excel spreadsheets as output, which were consumed by accounts payable. Integrated **KDB** database, and written in **Python**
- Built an internal database of candidates for recruiting. Extracted structured data from a variety of data sources, including: scraping LinkedIn; internal databases; and government data. Integrated **Sybase** and **ElasticSearch**, and written in **Python** using **SQLAlchemy**
- Extracted structured data from EDGAR 424B2 filings, and computed a “league table” report. Integrated an **ML** classifier model. Performed data analysis using **Pandas** and **Jupyter notebook**. Written in **Python**

Curvewise (Co-Founder)

Jan 2018 - present

- Architected and built a web application for measuring **3D** scans of human bodies, and reviewing those measurements across a range of sample body data
- Developed all layers of the application stack: front-end (**TypeScript, React, GraphQL, Apollo, Three.js**); back-end (**Node.js, Heroku, PostgreSQL, PostGraphile**); cloud computing (**AWS Lambda, S3, Python**)
- Managed a team of three sub-contractors who used the custom software we built to measure customer body data and produce reports. **Pandas** and **Jupyter notebook** were used for data analysis

Jacobean Research and Development (Founder)

Mar 2017 - Jan 2019

- Built a commercial business model around my **open source** project **SCION**, which is a **runtime, compiler** and **tooling** (**graphical debugger, CLI**, etc.) for **SCXML/StateCharts** in **JavaScript/TypeScript**. Designed to be **embeddable** in **IoT** devices, and different language runtimes (e.g., **node.js**, browser, **JVM, .NET CLR**, etc.)
- **SCION** has been used successfully to implement several successful commercial enterprise systems, including by 24[7] Inc. (to build multi-modal support experiences), and Inficon, to control an embedded system (gas chromatograph)

Morgan Stanley (Consultant) **Oct 2015 – Mar 2017**
• Helped incubate and launch a system for commercial real-estate loan origination. Written in **Java, Spring, JavaScript**, and **Angular.js**.
• **Managed** a team of 4 front-end developers

HBO (Consultant) **Jul 2014 – Jan 2015**
• Ported the **HBO GO** app from Xbox to the **Amazon Fire Stick** device

INFICON (Software Engineer) **Sept 2011 – Oct 2013**
Developed user interfaces and systems software for an embedded Linux device (gas chromatograph) using **Angular.js, Node.js, SCXML**, and **SCION**

Google Summer of Code 2010 (Participant) **May – Aug 2010**
Developed SCXML-JS, a Statechart-to-ECMAScript compiler written in **ECMAScript** and **XSLT**, to facilitate the development of rich **user interfaces** for the World Wide Web

McGill University Institute of Islamic Studies (Software Engineer) **May – Aug 2010**
Facilitated custom **MediaWiki** deployment to allow collaborative annotation of manuscripts

Google Summer of Code 2009 (Participant) **Mar – Aug 2009**
Implemented a project for the Eclipse Foundation, to extend the **Eclipse Modelling Framework (EMF)** to generate graphical **Domain-Specific Languages (DSLs)**

Wright Technology Solutions (Software Engineer) **Sept 2008 – Mar 2009**
Worked primarily with the **Dojo** JavaScript toolkit's widget and data API's, in order to implement the user interface logic of a data-driven **Rich Internet Application (RIA)** for online backup and storage

The MathWorks (Software Engineering Intern) **Aug 2007 – Jan 2008**
Worked to design and implement Viewmarker, an application written purely in **MATLAB**, intended to allow easy creation and sharing of visual bookmarks of **Simulink** models

Merck Frosst, Ltd. (Software Engineering Intern) **May – Dec 2005**
Developed a full solution (**front-end, back-end, embedded**) for managing radioactive waste. Used **C#** to integrate a barcode scanner. Back-end written in **Java/J2EE**; front-end in **JSP**

Teaching Work Experience

Instructor at Syracuse Careers in Code **July – Aug 2019**
Instructor for 24-week coding bootcamp based in Syracuse, New York

Publications

State Machines as a Service **July 2015**
Authored publication for 2nd Workshop on Engineering Interactive Systems with SCXML. Described cloud orchestration platform for the Internet of Things

Developing Rich, Web-based User Interfaces... **May 2013**
Thesis published toward the completion of a MSc. degree at McGill University

Developing a Statechart-to-ECMAScript Compiler... **2010**
Authored publication for 8th International Conference on Scalable Vector Graphics

Modeling the Reactive Behaviour of Scoped User Interfaces... **2009**
Authored publication for 7th International Conference on Scalable Vector Graphics

Rapid Development of Scoped User Interfaces **2009**
Authored publication for Human-Computer Interaction, 13th International Conference

Open Source Software

StateCharts Interpretation and Optimization eNginE (SCION)

Provides a robust implementation of the W3C SCXML standard in portable ECMAScript

Education

Bridge Academy Blockchain Development Fellowship	2018 – 2019
McGill University, MSc. Master of Science in Computer Science	2009 – 2013
McGill University, BA Bachelor of Arts in Computer Science with distinction	2003 – 2007

Technical Skills

Programming Languages

- **JavaScript/TypeScript** (Front-end, Node.js, embedded)
- **Java**
- **Python**

Technologies

- **Web Front-end:** HTML, CSS, SVG, XML, JSON, Ajax, jQuery, Angular.js, React.js
- **Web Back-end:** Node.js, Java, Spring
- **Automated Testing:** Karma, Jasmine, Mocha, JUnit
- **Continuous Integration:** CircleCI, Jenkins
- **Databases:** PostgreSQL, ElasticSearch, CouchDB, Oracle, Sybase, SQLAlchemy
- **Cloud infrastructure:** AWS, Lambda, S3, EC2, serverless architecture, boto3
- **Version Control Systems:** Subversion, Git
- **Mobile Apps:** PhoneGap, Cordova
- **Mapping and Data Visualization:** Leaflet, d3.js
- **Build Systems:** Make, Ant, Maven
- **Compilers:** Flex, Bison, SableCC
- **Modeling:** Statecharts, SCXML, XState, SCION, domain-specific languages
- **Embedded Systems**

Volunteering

Streetlives **2018 - Present**
Develop a **mobile web app** for homeless users to find social services in New York City, as a part of Civic Hall's 2018 DeltaNYC program

Languages

English, French (conversational), **German** (conversational)