Patrick Huarng

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EDUCATION

- **The University of Chicago** — Chicago, IL
  Master of Science in Computer Science; GPA: 3.8 — *Aug. 2017 – Jun. 2019*

- **Oregon State University** — Remote; Corvallis, OR
  Post Baccalaureate in Computer Science; GPA: 3.9 — *Jun. 2016 – Aug. 2017*

- **Michigan State University** — East Lansing, MI
  Bachelor of Arts in Finance; GPA: 3.5 — *Aug. 2007 – May. 2011*

EXPERIENCE

- **Amazon Web Services (AWS)** — Seattle, WA
  Senior Software Development Engineer - SDE III (EC2) — *October 2021 - Present*
  - **SnowTube**: Architected and led the development of SnowTube, a low-latency, Flink-like streaming and clustering system powering EC2's core platform, processing petabyte-scale EC2 resource events (e.g., Virts, VPC, AMI). Achieved sub-second latency and 99.99% uptime. Currently leading a project leveraging this system to save $1M annually by optimizing compute resource usage. Migrating streaming infrastructure from custom JournalDB technology to SNS/SQS, enabling unlimited fanout and throughput. Spearheading a new service (and team) to build Kafka clusters for SnowTube and the EC2 organization.
  - **OpenSearch Adoption**: Led EC2's migration from MySQL to OpenSearch, managing self-hosted clusters to support ad-hoc NoSQL queries for 10+ resources (AMIs, VPCs, etc.). Enabled AWS's strategy to deprecate MySQL clusters. Ensured latency-sensitive queries were the same or better than MySQL, enhancing platform scalability and performance.
  - **Innovative Contributions**: Leveraged frontend expertise to guide adjacent EC2 teams in building robust React applications, upskilled 2+ team members. Developed RAG and agentic applications to query OpenSearch and internal documentation, improving user interaction and team efficiency for internal EC2 teams. Handling these projects outside core responsibilities, when time permits.

- **Amazon** — Seattle, WA
  Software Development Engineer - SDE II (Digital Services) — *Jan 2021 - Oct 2021 (10 months)*
  - **Discovery**: Discovery is a Java, Tomcat, RPC service that serves up over 100,000+ RPS of traffic. It's purpose is to power Amazon's digital catalog services by aggregating and caching product metadata from many downstream systems. We maintain a proprietary transformation technology ("dockets") that allows customers the ability to query and transform product metadata into a "product" for their business. I assumed the role as tech lead for the team, designed and implemented new features (1:n offers, collections, etc.), and helped drive down the operational burdens on the team.
  - **Collections**: Collections is a Java, Gremlin, Neptune, RPC service that enhances Amazon's digital catalog services by providing customers and services a means to build relationships amongst data (via graph database). This technology currently powers Alexa's skill categorization service, but we intended it to handle many other use-cases like product-bundling, classifications, hierarchies, and graph traversals. My role on this project was to course-correct, redesign/refactor, and operationalize the system.
  - **LaunchPad**: LaunchPad is a TypeScript, NextJS, Java, GraphQL, RPC service that allows Amazon teams to develop custom, product detail pages using JSON and code artifacts. This service speeds up delivery and development of detail pages from quarters to mere weeks. My contributions towards this project is leading both frontend and backend development of the service, as well as leading customer onboarding and delivery into production.

- **M1 Finance** — Chicago, IL
  Senior Software Engineer (Portfolio & Data Tech Lead) — *Nov 2019 - Jan 2021 (1+ years)*
  - **Performance**: Performance is a Scala, Lagom, Akka, Kafka, SQS service that provides cashflow and performance calculations to our users (serves up more than 450 RPS under peak load). Refactored much of the core logic for money-weighted return calculations, dividend and trade cash flows, re-migrated tens of millions of records, and made the system more stable by handling network failures better and refactoring parts of the app to use a message-based architecture.

- ○ **Fraud**: Fraud is domain that is housed in multiple different backend services. The solutions I have helped build include: Plaid integrations to get external banking information; Socure integrations to risk-score users when we onboard them; designed and developed a rules-pattern for ACH transfers in/out of M1. All solutions described here use the following technologies: Scala, Lagom, Akka, and Kafka.
  - ○ **Broker**: Broker is a service that accounts for a user's cash, positions, and account information. It is responsible for more than 80% of revenues and is a very critical and complex domain. As a core developer on this system, I have used Lagom and Akka to add new, event-sourced entities to the system (ie. most recently IRA activity and business rules) and resolve issues by hardening the system via bugfix and/or writing additional reactive or batch-based logic.

- **University of Chicago: Center for Translational Data Science**   Chicago, IL
  Software Engineer   *Apr 2019 - Nov 2019 (8 months)*
  - ○ **GDC API**: The GDC API is a Python-Flask system that handles over a 1 million downloads a month and over 10 petabytes of data downloaded annually. Implemented new features like admin endpoints and tarfile download of clinical data.
  - ○ **Reports API**: Convert the reporting features of the GDC API into a microservice. Containerize and deploy the new microservice into various environments. Enhance batch processes to backfill data with additional information (ie. genomic experimental strategy).
  - ○ **ESBuild**: ESBuild is a Python batch-layer system that creates the data for ElasticSearch indices. Refactored and improved caching and denormalization processes of the system improving memory consumption and runtime performance.

- **UChicago Systems Research on Availability, Reliability, and Efficiency**   Chicago, IL
  Research Assistant   *Nov 2018 - May 2019 (6 months)*
  - ○ **MittOS Memory**: Advised by Dr. Haryadi Gunawi and Cesar Stuardo. Research focus is on making distributed systems more performant by being able to signal to other machines that the JVM is in a stop-the-world garbage collection phase. Solutions implemented in OpenJDK 8, Java, and C++.

- **National Opinion Research Center at the University of Chicago**   Chicago, IL
  Software Developer   *Oct 2018 - Apr 2019 (6 months)*
  - ○ **Getting on Track**: Getting on Track is an education application that helps teachers and social scientists measure nationwide kindergarten readiness. Maintained the application, implemented new features, and modernized the Django-JQuery application into separate front-and-backend applications (VueJS and Django-REST).

- **Braintree (a Paypal Company)**   Chicago, IL
  Data Operations   *Jun 2018 - Aug 2018 (3 months)*
  - ○ **Batch Systems**: Develop batch systems for the data operations team to process over 12 trillion records. Aggregate various information sources (incidents and other operational data sources) to determine merchant satisfaction levels using a logistic regression model.

- **Information Services Group (ISG)**   Detroit, MI; Stamford, CT; Chicago, IL
  Consulting Manager   *Dec 2011 - Apr 2019 (8+ years)*
  - ○ **Strategy & Digital Advisory**: Specialized in strategy, digital advisory (agile, cloud), outsourcing transaction advisory, and research across Financial Services, Technology, Insurance, Pharmaceutical, Air Delivery, Healthcare, Real-Estate, and Automotive industries. Ranked top-five consultant firm-wide, earning Chairman's Club honors twice (less than 2% of firm annually). Advised clients on cloud migration to AWS/Azure, leading migration planning and cost analysis (e.g., data center TCO vs. cloud). Led agile transformation for a payments company over three engagements, driving process changes and vendor selection. Conducted research on process automation and data analytics, facilitating outsourcing transactions. Regularly published in ISG Insights on automation and agile.
  - ○ **Software Development**: Developed ETL scripts, business analytics dashboards, and thick-client applications for rapid data processing, enhancing client reporting and operational efficiency.

Programming Skills (Interests)

- **Programming Languages**: Kotlin, Java, Scala, TypeScript, JavaScript, SQL, Python
- **Technologies**: AWS, CDK, Kubernetes, Terraform, GitHub, CircleCI, Akka (Pekko), DynamoDB, PostgreSQL, NodeJS, React, NextJS, Kafka, OpenSearch, SNS/SQS